THE IRON TRADE REVIEW

VOLUME XXVII. CLEVELAND, O. JULY 5, 1894. CHICAGO, ILL. NUMBER 27

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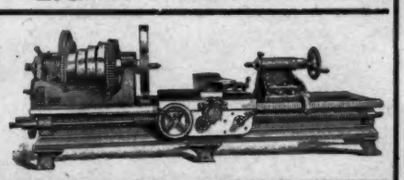

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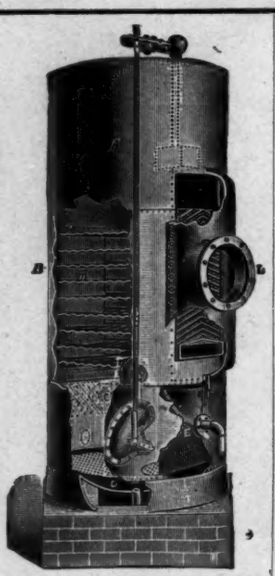

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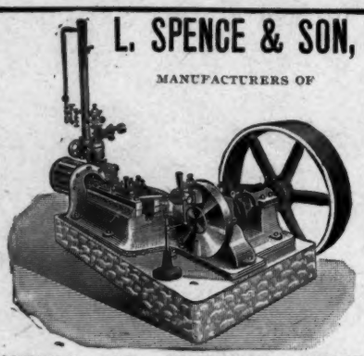

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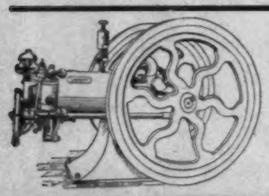

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THE IRON TRADE REVIEW

VOLUME XXVII. CLEVELAND, O. JULY 5, 1894. CHICAGO, ILL. NUMBER 27.

THE WEEK IN IRON CIRCLES.

GENERAL FEATURES.

The week has been marked by the close of a half year, the most unsatisfactory in many respects the iron trade has ever experienced. Certainly no like period has been less remunerative. Hopefulness, that always mitigates the most cheerless outlook, is still a characteristic of the market and the disposition to see the beginnings of a change for the better, still abides; but at the moment the situation is not specially encouraging. The coal strike served to put a better face on some parts of the market the last two months of the six, so far as prices were concerned; but it also killed off a certain volume of business, and the question yet to be solved is how far any gain in prices can be projected beyond the removal of the cause. The pig iron outlook is on the whole more promising than at any time since the opening of the year. Foundry iron has been lifted out of its lowest depth of four or five months ago. Mill iron, after sinking to its lowest point at the end of the first quarter, recovered the lost ground and went as high as $10, Pittsburg, the epening price of the year, but is now a trifle weaker. Bessemer, from $10.75 at the opening of the year, went as low as $10.25, Pittsburg, and then climbed to $13.50 under the coke scarcity, and is now quoted for future delivery from 75 cents to $1 above the opening price. While it is agreed that Bessemer will not touch the low level seen in the early months of the year, opinions differ as to the proportion of the advance that will be maintained when there is a general resumption of furnaces. While a good deal has been said about the unexpectedly low price of coke for the balance of the year, a factor that has not been much considered is the probability, amounting almost to a certainty, that furnace labor will be on a somewhat higher basis, particularly at Pennsylvania and Ohio furnaces, when they resume. In the week just closing, Chicago is practically the only seat of activity in pig iron. There the fourth week of contracting by agricultural buyers and other foundrymen was witnessed, local coke iron being the principal purchase. Pittsburg saw some buying of Bessemer, and one transaction of 5,000 tons and another of 3,000 tons are reported, deliveries through the balance of the year at $11.50. Valley furnacemen, whose minimum was $10 in the valley before the coal strike, now have their lowest figure $1 higher. The finished material demand is not on a scale to warrant rosy predictions. In plates, for example, barring 2,000 tons on Lehigh Valley Railroad account and the requirements of two boats at the Chester shipyards, there has been only a small-order demand. Bridge work saw its height earlier in the year. Railroad demand is no better, outside of a certain amount of contracting for track supplies which comes at this time of year. The usual dispute over wages which involves the mills at the end of the half year, has already been terminated as far as many firms are concerned. The iron scale caused no trouble and Jones & Laughlins' signature to the steel scale removes a large chance of trouble. The sheet mill and tin house scales are yet to be settled, with better prospects of agreement than at any time since they were made. Meantime only a few sheet mills and tin mills are in operation. The scarcity of billets and slabs has caused a slight advance in steel sheets, and cut nails have been put up to $1.15. In wire rods, some inquiry appears for July and August delivery, and while buyers announce their ability to contract at $24, makers claim that the advance in billets calls for a $25 figure.

THE CLEVELAND OUTLOOK.

In spite of the interruption of iron ore shipments from the Gogebic range, the total brought down up to July 1 runs close to 2,400,000 tons, as noted elsewhere. It is well known that shipments have been crowded, particularly from the head of Lake Superior, and it is probable that with five months of the season yet remaining, 40 per cent. of the '94 shipments of ore have been made. Some lower lake docks are already becoming crowded. The strike at Ironwood still hangs on. On Tuesday it reached the riot stage. The Norrie steam shovels were started on Monday with new hands and the next day several hundred strikers marched against them. There was firing on both sides and several strikers were wounded, two fatally. Later State troops were brought on the ground and hostilities ceased. At present there is little loading from stock piles, as the railroad tie-up has stopped trains to Ashland. Vessel rates are unchanged at 60, 55 and 40 cents for Ashland, Marquette and Escanaba respectively. The latest contract tonnage is 100,000 tons from the head of the lake at 80c.

Pig Iron. Among valley furnaces the only resumption is that at Hubbard, on foundry iron. At New Castle, one stack is about to start and two others will follow within the fortnight. Pittsburg shows considerable additions to Bessemer producing capacity, particularly by the leading maker. A 10,000-ton purchase of Bessemer at $10.50 at Pittsburg is reported, bringing the valley price to $10.85, but this is below the ideas of most valley sellers. A considerable addition to producing capacity is looked for in the next two weeks and the test of the new basis of values will soon be made. Foundry iron is unchanged; mill iron slightly weaker.

Finished Material. Demand is light for all classes of mill products, and while prices on bar iron, plates, beams and channels, etc., are weaker, they are still closer to the fuel-famine basis than buyers had expected. Plates are still quoted $1.25 at mill and beams and channels at the same figure. Steel sheets are in good demand and are firmer. The Union Rolling Mill Co., Cleveland, will sign the scale this week and resume on Monday.

THE CHICAGO OUTLOOK.

[SPECIALLY REPORTED FOR THE IRON TRADE REVIEW.]

The local situation is very much unsettled this week, because of the strikes on all of the railroads. Several of the large manufacturing concerns have already shut down because of their inability to get their materials delivered, and the iron and coal dealers are having a great deal of trouble to make deliveries. It was stated by an officer of the Illinois Steel Co. that if the strike is not declared off by the last of the week their works at Milwaukee, Joliet and South Chicago, the only ones at present in operation, will be shut down. Altogether, the situation is very serious, and there appears to be every probability that it will be unchanged or even worse at the end of the present week.

PIG IRON.—Sales were again large in the past week, aggregating over 30,000 tons, of which nearly all was local iron. Most of the sales made were for large lots and extended deliveries, although a fair carload business was done. Deliveries of iron were not quite so large as those of the week before, and reports from the foundries indicate a falling off in their trade. It is the present intention of the Iroquois furnace to blow in some time this week. but there may be delay because of the strike, which will prevent them from getting fuel. It is also possible that the Bay View furnace, now in blast, may be compelled to bank for the same reason. Southern iron is quiet. Prices have been advanced because of the advance in freight rates of 25c. No sales of any consequence have been made, and the inquiry has fallen off to a large extent. In Lake Superior charcoal very little business has been done, orders being confined to carload lots.

BARS.—The demand has fallen off to some extent, and while a fair lot of sales were made last week, there is nothing to indicate a continuance of orders. Prices are unchanged at 1.05c to 1.10c for bar iron, and 1.25c to 1.30c for steel.

STRUCTURAL MATERIAL.—The market has been quiet, and orders are limited to small lots for immediate use. Prices are as last reported. Beams and channels, 1.50c to 1.60c; plates, 1.50c to 1.55c; angles, 1.50c to 1.55c; tees, 1.70c to 1.80c. Small lots from stock are quoted ⅛c higher.

RAILS AND TRACK SUPPLIES.—There is no change in the situation. Orders are still limited to small lots, of which a fair tonnage was closed. Quotations are unchanged: Rails, $25 to $27; splice bars, 1.40c; track bolts, 2.10c. to 2.20c; spikes, 1.80c to 1.90c.

BILLETS AND RODS.—Sales of billets amounting to 2,000 tons were made last week, at our last quotations, $18.25 to $18.50. It is expected that if the strike is not over before the end of the week, the billet mill at Joliet will have to close down. The rod mill has already shut down, owing to lack of orders from the wire mills, which are all closed for the present. Quotations are only nominal at $25.

PLATES.—Store business is still very fair, but mill orders are very scarce. Quotations are unchanged as follows: Tank steel, 1.45c to 1.50c; flange steel, 1.65c to 1.75c; fire box steel, 3.75c to 4c; boiler tubes, 75 per cent. discount.

MERCHANT STEEL.—Mill business is still very scarce, but a good run of small orders for shipment from store is being received. Prices are as last reported: Open hearth spring, machinery and tire steel, 1.85c to 1.90c; crucible spring, 3.50c; machinery, 4.50c to 4.75c; tool steel, 6½c and upwards.

SHEETS.—Galvanized sheets are selling fairly well in a small way from stock, but no large orders are being received. Quotations are maintained at 75 and 10 per cent. discount from store, and 75 and 15 at the mill. Black sheets are quiet, the demand being limited to store shipment. Prices are made at 2 40c to 2.45c for No. 27 common, f. o. b. Chicago.

OLD RAILS AND WHEELS.—Business is very light, and no sales of any importance have been reported. Quotations are only nominal, as follows: Old steel rails, $7 to $10, according to length, etc.; old iron rails, $10; old car wheels, $10 to $10.50.

SCRAP.—The market is very quiet, and no large sales have been made. Prices are nominally as follows: No. 1 forge, $9; No. 1 mill, $6 to $6.50; No. 1 machinery, $7; axles, $13; cast borings, $3.50; wrought turnings, $4; axle turnings, $5.50; mixed steel, $5; coil steel, $7; leaf steel, $8; heavy cast, $7; stove plate, $5.

GENERAL MARKET RESUME.

[SPECIALLY REPORTED FOR THE IRON TRADE REVIEW.]

Pittsburg. The week has been one of the quietest of the year. In the blast furnace situation, there are several changes and to-day 14 furnaces, including 8 Edgar Thomson, are active. The coke supply grows with every week but is now only about half what the Pittsburg district ordinarily requires. Sales of Bessemer continue to be made for July and August delivery. On a 500-ton lot, July delivery, $12.50 was secured; on a 350-ton lot, July and August delivery, $12. Later deliveries are not talked of; neither side of the market is prepared to negotiate. The slackness of operation among a good many of the mills is an index of the unsatisfactory demand, repairs having been taken care of in the intervals of operation in previous months, while outside of the sheet and tin plate mills there is no special obstacle to resumption on account of scale difficulties. The scarcity of coke keeps up the price of billets and $18 has been paid on July and August deliveries, though it is believed this can be bettered 50 cents. There has been no real test of the market, however, as buyers are holding aloof, their order books being in such shape that they are not compelled to cover now. The leading mill working under Amalgamated auspices will continue in the union column, having practically arranged its scale.

Cincinnati. The situation as to the Southern furnaces is mixed, owing to the freight advances obtaining July 1st, and the inability of the furnaces in blast to supply No. 1 soft and No. 2 soft, and No. 2 foundry and No. 3 foundry in anything like the quantity required by the trade. One of the most important companies of the Birmingham district, with four stacks, but no iron on hand, withdraws from the market until better prices prevail. Another prominent company, with two large stacks, retires from the market until sales can be made at $2.50 per ton above figures current the fortnight. The Tennessee C. I. & R. R. Co. heroically continue selling for quick delivery, such grades as they have for sale, at prices entirely acceptable to reasonable buyers. The extraordinary activity of all the cast iron pipe works throughout the country explains largely the unusual requirements for soft foundry grades. The sentiment prevails that trade generally will revive after the stock taking and the balancing up at the beginning of the latter half of 1894. Buyers of pig iron may reasonably expect an advance in prices at least sufficient to cover freight advances North and South, and the great expense attending the coal and

[Continued on page 6.]

THE IRON TRADE REVIEW

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ENTERED AT THE POST OFFICE IN CLEVELAND, O., AS SECOND CLASS MATTER.

JULY 5, 1894.

A BOYCOTT THAT WILL NOT WIN.

It matters not what are the merits of the controversy between the Pullman company and its employes, there can be no defense for the boycott which President Debs, of the American Railway Union, has been trying to enforce against railway companies hauling Pullman cars. While there are features of the arrangements at Pullman, Ill., that we regard as far from ideal, and calculated, particularly in times such as the country has seen in the past year, to make the unpalatable ingredients of Pullmanism taste, in spite of the sugar-coating, the company's statement of the conditions preceding the strike makes plain the folly of precipitating trouble at this juncture. There is no room to doubt that the company has taken contracts at a loss, in order to keep its men employed.

But in the Debs boycott, the Pullman issue is neither here nor there. Because A and B are at odds, for C to pick a quarrel with D and to serve notice that he will keep up the fight until A and B come to terms, is the very climax of injustice and folly. The American Railway Union insists that railroads, bound by solemn contracts with the Pullman company and liable to heavy damages if they break them, shall refuse to carry out these agreements, and because the railroads decline, members of the union throw up their jobs. Not only that, but the almost inevitable next step is the intimidation of men who take their places and reckless assaults upon the lives of an innocent public by ditching trains and a bombarding those that move, with missiles and bullets. President Debs declaims all responsibility for violence and in print urges that the men refrain from lawlessness. But President Debs started the fire; he knew perfectly well that the materials were inflammable; he is responsible for the conflagration.

Lives have been endangered; the passions of destruction and of revenge have been aroused; anarchists have been furnished the opportunity they covet; hundreds of thousands of dollars in wages have been lost: inconvenience and loss in a thousand ways have been inflicted upon the people at large, who have no part in the quarrel —only evil has resulted from the stupendous folly of a few men in whom tens of thousands of employes have lodged their fortunes, and virtually the control of their lives. That the boycott, that has long been under the ban of statute and public opinion, should be revived at this stage of the country's misfortunes, only indicates that there are men in places of leadership who want to precipitate a carnival of disaster and lawlessness. Fortunately, the strong arm of the Federal government has been thrust between the rioters and the people and the indiciatons are that short shift will be made of the autocracy of Dubs.

SHRUNKEN IRON AND STEEL IMPORTS.

The Treasury Department's statistics of iron and steel imports into the United States in May tell practically the same story that has been repeated in these tables month by month for quite a year. Probably the most pronounced shrinkage is in iron ore, the total brought in in May being but 9,645 tons against 64,834 in May, 1893. The value of the May ore imports this year was $1.51 a ton; in May, 1893, $1.72. Of all iron and steel imports in May, excluding ore, the total value was $1,639,807, against $3,575,680 in May last year, a falling off of more than 50 per cent. For the 11 months ending May 31, the total value was $19,081,229; for the 11 months ending on the same date last year, $31,350,378. The imports of the various descriptions of iron and steel in May of each year, and for the 11 months ending May 31, 1894 and 1893, respectively are given in the following table in tons of 2,240 pounds:

	Month ending May 31.		11 months ending May 31.	
	1894. Tons.	1893. Tons.	1894. Tons.	1893. Tons.
Pig iron	1,049	5,243	23,733	54,349
Scrap iron and steel	149	534	2,719	18,527
Bar iron	477	203	9,721	15,325
Steel and iron rails	1	1	2,178	251
Cotton ties	.....	163	800	1,516
Hoop, band or scroll iron	131	152	839	1,147
Ingots, blooms, etc	793	3,861	11,768	28,937
Sheet iron and steel	2,515	3,360	24,616	37,361
Tin plate	18,618	37,351	185,118	253,663
Wire rods	1,393	3,165	24,064	38,596
Totals	25,126	53,033	285,556	449,672

Pig iron has fallen off 80 per cent. Scrap iron is 72 per cent less than in May, '93, while in the 11 months the falling off is about 85 per cent. Ingots, blooms and billets are only about 20 per cent. of the imports in May, 1893, and sheet iron and steel has dropped off about 25 per cent. Tin plate is a fraction over half what it was in May last year and wire rods have decreased 57 per cent.

THE TARIFF BILL READY FOR CONFERENCE.

After nearly fourteen weeks of debate, of amendment and reconstruction, of barter and pledge, of threatening and concessions, of bandied scandal and recrimination, the tariff bill has passed the Senate—weighted with an income tax, mottled with semi-protection and so far at variance with the views of every leader that it goes to the world without a name. The vote was 39 yeas and 34 nays, about as predicted. Conference committees have been appointed and the struggle now will be to get the bill in final form and secure agreement upon it within another month. Indications have multiplied, as the Senate surprises have come, one after another, that the House radicals will not contest the ground that has been swept from under the Wilson bill, week by week. It has come to be well understood that certain Senators are ready to defeat the bill unless it embodies a measure of protection to the interests of their section. This determination may be counted on to save the 40 cent duty on iron ore and coal.

The intimation has already come from the Wilson contingent that they are not in the mood to fight for a point here and there, seeing that so complete wreck has been

made of what they were once proud to call by the name of their leader. And the belief that the administration would take a hand in the struggle to restore many Wilson bill features, is modified by the knowledge that the administrations greatest anxiety is to get a new tariff bill of some sort upon the statute books.

In the final shuffle in the Senate, the indefensible provision putting fence wire upon the free list, was stricken out. The incongruity of making an article free, whose primary forms were all subject to duty, is only one illustration of the irrational features of a bill made up of trades and bargains. When it became known that enough Populist votes could be had on the final passage, without putting barb wire on the free list, the change was quickly made. Tin plate manufacturers who had hoped to have the duty on their product raised from 1.2c. to 1.6c. found that the limit of tension had been reached.

What the final passage of the bill, with its good features and bad, will do for the business of the country, must be left to the demonstration of events. Wage questions enter into the account and the determination of the exact basis upon which manufacture can be profitably carried on in this country, against foreign competition made fiercer than ever by lowered duties, will not be a matter of a day or a month. It remains to be seen how much lower foreign producers are willing to put their prices in order to dispose of their surplus in this market. Some industries in which the issue is less in doubt, will be able to fix their future status more promptly than others and in these a moderate revival may be looked for, but the readjustment will take time, and the prophecy of instant starting of wheels on all sides which some prophets have hinged on the final passage of the bill, is likely to be disappointed. A speedy transit through conference, is the thing now to be desired above all.

GERMAN VS. ENGLISH IRON AND STEEL.

The British Iron Trade Association, concerned at the growing imports of iron and steel into Great Britain and the increasing success of continental competitors in neutral markets, started an inquiry some time ago into the causes. Belgiam and German competition were most noticeable, and the investigation has had special reference to the growth of iron and steel industries in those two countries. The report on German competition has just been made by Secretary J. Stephen Jeans and it is suggestive that in the same issue of the London *Iron and Coal Trades Review* which contains this report, there is an editorial comment on the tendency of British iron and steel manufacturers to pay more attention to technical matters, in their associations, and to set economic considerations to one side. "It is probable," says the *Review*, "that the iron trade has lost a good deal by reason of this indifference to the questions that it is the special function of the Iron Trade Association and chambers of commerce to discuss. Hostile tariffs, labor difficulties, repressive and burdensome legislation, and cognate matters, have probably, on the whole, done more to hinder the progress of our trade than technical improvements and discoveries have done to help it."

At the outset, Secretary Jeans calls attention to the fact that in 1893 Germany supplied Great Britain with 116,076 tons of iron and steel, or 9½ per cent. of her total exports; and that besides this Germany sent, in the same year, 92,550 tons to British colonies. An interesting table that tells the story of the iron industry in the two countries in the decade ending 1892 is then given as follows:

	1882. Tons.	1892. Tons.	Increase. Per cent.	Decrease. Per cent.
MAKE OF PIG IRON.				
Great Britain	8,586,000	6,709,000	—	22
Germany	3,380,000	4,937,000	46	—
MAKE OF MANUFACTURED IRON.				
Great Britain	2,841,000	1,561,000	—	45
Germany	1,496,000	1,224,000	—	18
MAKE OF STEEL.				
Great Britain*	2,073,000	2,919,000	41	—
Germany	1,075,000	1,970,000	83	—
EXPORTS OF ALL DESCRIPTIONS OF IRON AND STEEL.				
Great Britain	4,353,000	2,739,000	—	37
Germany	1,150,000	1,309,000	11	—
EXPORTS OF MANUFACTURED IRON AND STEEL.				
Great Britain	2,595,000	1,962,000	—	24
Germany	872,000	1,137,000	30	—

*Not including crucible steel, of which the production may be about 100,000 tons per annum, but of which no exact details are available.

The comment of Secretary Jeans on this showing is interesting and significant. We have room for but two paragraphs, but these will furnish much food for thought:

Without venturing upon the discussion of the vexed question of protection *versus* free trade we may point out, as is done by several of our members, that the protection which the Germans enjoy in their own home market is of great advantage to them in international competition, by enabling them to sell to their home consumers at a relatively high, and often a regulated price, so that they can dispose of their surplus produce—as they actually do—at a relatively low price. As a general rule the German workers quote two different scales of prices, one for their home buyers and another for export, and the latter, although always lower, is also frequently a much more elastic figure than the former. Against this sort of rivalry English manufacturers naturally find it difficult to compete. It is, in point of fact, competition of a very unfair kind, and one which it would only be possible to meet by fighting with the same weapons under more or less kindred circumstances. * * *

It has been pointed out that there is a prevalent opinion that our greatest competitors in trade—say, Germany, France and Belgium—are largely dependent upon us for coal. Far from this being the case, they raise already sufficient for their own use, and could easily increase their output; besides which they have plenty of cheap skilled labor wherewith to work it up into manufactured goods like our own, the raw material for which is as accessible to them as to us. Unless, therefore, the coal and the labor we put into our goods for export is obtained at such a rate that it enables us to compete successfully with our foreign rivals, it seems as if our general trade must gradually decrease. Our laboring classes would be the first to suffer under this state of things, for, in order that they may be supplied with the very necessaries of life, we have to import food to such an extent that in the year 1893 it amounted to about £152,000,000 for home consumption, or fully £3 17s. per head of our population; in fact, this "food import" alone was more than equal to one-third of the value of goods of all kinds which we imported into the United Kingdom. No country is similarly dependent upon others for the supply of its daily wants.

GENERAL MARKET RESUME.

[Continued from Page 4.]

little, another advance for a margin of profit may be looked for.

Louisville. The demand continues light on the part of most iron consumers. Stove companies are almost all shut down, with little work. Car companies are either closed entirely or running on small orders. Pipe shops report good business, but prices yet show no improvement with them. The scarcity of soft and silvery grades continues, and their prices have advanced, so that No. 2 soft iron is selling for as much as foundry. Consumers, however, are only buying at present prices from week to week, and are not willing to contract for a large amount. There is no movement in car wheel irons, and they are very much depressed.

INVENTED COLD-ROLLED SHAFTING.

Bernard Lauth, for more than 60 years identified with the manufacture of iron in the United States, died at Howard, Centre County, Pa., June 25, in his 74th year. Born in Alsace Lorraine, France, he came to the United States in 1831. Entering Shoenberger's rolling mill at Pittsburg, he worked seven years, and later was in charge of a train of rolls at Hoke & Hartman's Works in the same city. After being part owner of a merchant mill in Zanesville, O., for several years, he returned to Pittsburg in 1852 and, with a brother, started the American Iron Works, now owned by Jones & Laughlins. In 1858 he invented cold-rolled shafting. In the '60's Mr. Lauth organized the Reading Sheet Mill Co., where three high rolls of his invention were put up and demonstrated their great efficiency. He also put in universal rolls, these being the first erected in this country. Mr. Anthony Kloman, seeing them at work at Reading, introduced them into his own mill at Pittsburg. Mr. Lauth also patented a continuous mill for rolling hoops and strips. This is now in very successful operation. In 1871 he purchased the Howard Iron Works, at Howard, Pa., operating them for a number of years and then selling them. The *Bulletin* gives these incidents:

When he made his invention of cold-rolled shafting he experimented a great deal on thin sheet iron, and was anxious to reach some method by which he could secure a reduction in the thickness of thin sheets and a finer finish for their surface. He knew that he could do this if he could use rolls with a small diameter, but as he attempted to reduce the rolls they would spring and break. One night he and his oldest son, Mr. B. C. Lauth, were traveling from Paris to Strasburg, when the thought occurred to him that he could place a small roll between two large rolls and get the effect of the small roll and prevent its breaking by the support of the larger rolls. This was the end of the chapter, and his son received a thump and a shake to awake him and he was informed that he "had it." "Have what?" asked the son. "Why, I can roll single sheets and put a face on them like a looking-glass; that's what I want for Russia sheet iron." He then explained his invention in detail.

A short time afterwards he went to the works of M. DeWendel, at Hyange, near Metz, and explained his new mode, and suggested to M. DeWendel that it would be a great improvement for cold-rolling tinplate. That gentleman said that he would submit the plan to his engineers, which he did, and after a thorough investigation by five of them it was pronounced impracticable. They claimed that the small roll would break. This was a little more than Bernard Lauth could stand, and he said some hard words and begged to differ with them, stating that, with all due appreciation of their very learned technical knowledge, he was sorry to say that they did not know anything about rolling. He then turned to M. DeWendel and said: "I will build this mill at my own expense if you will pay me a certain sum of money if it accomplishes what I claim." This offer was accepted, and the mill was started and did more than was claimed for it.

The Connellsville Coke Situation.

The Connellsville coke strikers to the number of 6,000 or 7,000, held a mass meeting at Connellsville, Pa., July 3. Several addresses were made by leaders. Patrick McBryde, of Columbus, National Secretary, told the coke men that the only way the coke strike could be won was to get railroad men to declare a boycott against hauling coke out of the region. On July 1, the operators ran 13 car-loads of new men into the district and seven cars on July 2. Nearly every train out of the region is carrying old men to other fields and it is estimated that 500 have gone to the anthracite coal region the past week. There were several outbreaks on Monday, the worst of these being at Leith, where 20 new men had gone to work. A mob of foreigners swept down on them and drove them away, beating several severely.

Last Saturday Patrick McBryde held a conference with Thomas A. Lynch, superintendent of the H. C. Frick Coke Co. Mr. McBryde desired to arrange a conference between the striking coke workers and the Frick concern, but was informed that under no conditions would such a conference be entered into and the strikers must return to work under the terms set forth in the Frick scale which became effective on Feb. 1.

For the week ending June 23, the output of Connellsville coke ovens is estimated at 58,509 tons. The number of active ovens in that week is estimated at 5,940, or over one third of all. This was a net increase of 1,256 ovens over the preceding week. The shipments, 2,371 cars, increased 123 cars over the preceding week, Pittsburg receiving 1,334 cars. The Connellsville *Courier* says that "one coke firm sold about 30 cars of 12-hour coke a day for nearly a month at $4 per ton. The fuel was used by a railroad company just after the miners had put an embargo on coal by coming out the latter part of April. It was neither coal nor coke, but made a fairly good steaming fuel when nothing else was at hand."

Latest Scale Settlements.

The announcement that Jones & Laughlins have signed the Amalgamated scale and will resume on Monday, removes one element of uncertainty in the Pittsburg situation. On Saturday, June 30, the firm and its men reached an agreement on steel rates. In general the scale will be similar to the sliding scale in force at Homestead prior to the great strike. Wages will be based on the selling price of 4 by 4 steel billets, and will be adjusted every three months, according to the market price of billets during the three months last preceding. For every 25-cent advance in billets, wages advance 1 per cent. and for a 25-cent decline in billets, wages will be reduced 1 per cent. There will be a minimum price on billets, below which wages will not be reduced. There is a provision in the scale by which it may be terminated on three months' notice. An appointment has been made for another conference at Pittsburg, July 5, between the Amalgamated Association's committee and the Association of Iron and Steel Sheet Manufacturers. On Friday, July 6, further conference is to be had on the tin mill scale. As to the latter, the chief point in dispute is on a reduction in wages at the taking effect of the new tariff bill. Signatures to the tin mill scale have been received thus far from the American Tin Plate Co., Elwood, Ind.; the Morewood Co., Gas City, Ind., and P. H. Laufman, Ltd., Pittsburg. The Sharon Iron Co., Sharon, Pa., have signed the sheet mill scale, and the Falcon Iron & Nail Co., Niles, O., have signed the puddling and muck bar scales. Other signatures to the iron scale are those of the Eagle Iron & Steel Co., of Ironton, O.; Cleveland Hardware Co., of Cleveland; the Duluth Mfg. Co., of West Duluth, Minn.; Atlantic Iron Works, New Castle, Pa.; Muncie Muck Bar Co., Muncie, Ind. At Scottdale, Pa., the Scottdale Iron & Steel Co. have closed down and the management have not yet signed the scale.

At Irondale, O., the employes of Wallace, Banfield & Co., asked permission to examine the firm's books to see whether the mill could pay the present wages, even with a one cent cut in the duty on tin plate. The request was properly refused.

Among the Iron Mines.

The record of iron ore shipments from Lake Superior ports in June, in spite of the strike on the Gogebic, exceeds by 50 per cent. that of May, which had shown the largest total ever made in that month. The official figures of the St. Mary Falls Canal office show that 1,086,933 gross tons of ore passed through the Sault. Adding this to 793,256 tons in May, and 50,447 tons in April, makes a total to July 1, of 1,930,636—this representing the shipments from Marquette, Ashland, Two Harbors, Duluth and Superior. Last year the June shipments through the Sault were 717,691 gross tons and the total to July 1 was 974,512 gross tons, or only half what they are this year. If we put the Escanaba total at 450,000 tons for the months of April, May and June—this being merely an estimate—we shall have total shipments of ore up to July 1, of 2,380,636 tons. Last year's Escanaba total was far in excess of shipments this year, but the total this year from all ports is considerably more than on July 1st last year.

Iron ore shipments from Ashland for the last week in June were 41,008 gross tons; for the month, 295,865 tons; for the season 663,008.

Shipments from Two Harbors in June, closely estimated, are put at 275,000 tons, probably the largest month in the history of that port.

NEW ERA GAS AND GASOLINE ENGINE.

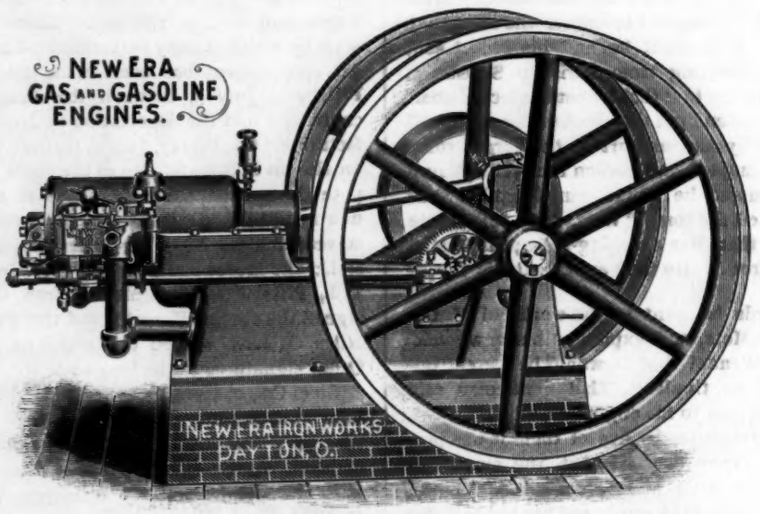
We illustrate herewith a new gas and gasoline engine in which admission, exhaust, etc., are controlled by poppet valves, and the governing is effected by the well known fly-ball governor driven from the same shaft that moves the valves. Two revolutions of the crank shaft complete the cycle of the engine, which consists of drawing in the charge of gas, compressing it, ignition and expansion, explosion or exhaust, these operations being performed in two revolutions of the crank shaft.

Ignition is effected by an electric spark which is passed into the cylinder from a small battery that needs refilling but once in three months. The valves and igniter are easy to reach. It is claimed that the engine is particularly simple in construction and easily kept in working order. The fly-wheels are heavy, securing regularity of action. The governor automatically shuts off the gas, should the main belt break or the engine be in any way entirely relieved of its load.

The engine is adapted for either manufactured, natural or gasoline gas, and even in the case of the first named it is stated that a given amount of light can be produced more cheaply by using the gas in this engine to develop a current to run incandescent electric lamps. The fields to which the New Era engine is adapted are varied, including foundries and metal working shops, pumping, hoisting, elevators, blacksmith shops, electric lighting, mining, conveying, and a long list of lighter requirements that are not of special interest to readers of this paper.

Gasoline is handled by this engine in such a way as to be practically safe. The fluid is pumped from a tank through a small tube, into the air chamber of the engine, from 3 to 15 drops at a time. It makes gas which a valve admits behind the cylinder, when an electric spark enters and explodes it. No gasoline or gas escapes. The governor controls the valve so it takes gasoline only often enough to do the work required of the engine. There is no chance for overflow or waste of gasoline, as the small pump draws it from the tank just as used in the engine.

The New Era engine is built by the New Era Iron Works, of Dayton, O.



NEW ERA GAS AND GASOLINE ENGINE.

MODERN BLAST FURNACE STACKS.

A. Porter Gaines, superintendent of the Cowan division of the Tennessee Coal, Iron & Railroad Co., presented a paper entitled "A Sketch of a Modern Blast Furnace Stack" at the June meeting of the Engineering Association of the South, at Nashville, Tenn. The general construction of a modern blast furnace stack was referred to as a round sheet iron shell, somewhat in the form of a truncated cone, supported at the base, which is the widest part, by columns. This shell is lined with fire-brick, having a packing space of three to five inches between the shell and the brick which is filled with some light loamy material. The points of difference are the dimensions of this shell, the height, diameter, distance from hearth or bottom, which shell shall be supported and interior shape or lines, as given by fire-brick lining. The conditions governing the dimensions are chiefly the character of the stock (fuel, ore and flux) and the volume of the blast. Modern practice is toward large outputs, and looking to this end the dimensions are as large as these conditions will admit. The interior shape, or lines, is more or less in dispute among furnace men. It is largely theory as to the mechanical arrangement and chemical changes that material undergoes in the stack, so necessarily it follows that there would be more or less difference as to the interior arrangement of furnace to obtain the best results. Then also the conditions are so different in different localities, that it is very questionable whether any specific lines will be found that will give universal success. Although there have been wonderful results obtained from the modern blast furnace stack, both in fuel consumption and output, still it is far from having reached its full development. While the progress of pig iron making may not be so rapid in the future as in the past, it will undoubtedly be changed materially, both as to construction of plant and practice. In the discussion which followed, Mr. A. H. Wood called attention to the fact that the output of the furnace at Cowan had been almost doubled recently by changing the lines, by closer attention and heavier driving than formerly, and that the output of other furnaces of this company had been largely increased by heavier driving only, without change of lines. Major Lewis suggested that this increase was at the expense of the quality of the iron, but this assertion was disputed by others.

Personal.

Albert G. Reeves, general manager of the New Philadelphia Iron & Steel Co., and Clara L. Welty were married at the bride's home at New Philadelphia, O., July 2.

Wm. C. Temple, for a number of years agent of the Babcock & Wilcox Co. at Pittsburg, has been admitted to partnership in the firm of H. E. Collins & Co., Pittsburg, dealers in iron and steel, ores and metals. Mr. Temple's high character and business ability are well known to the trade and we bespeak for him and his firm the same favor both have enjoyed heretofore.

J. F. Holloway, of New York, has a very entertaining reminiscence of "Early Steamboats on the Great Lakes," in the July number of the *Engineering Magazine*. The article is of special interest to engineers and as well contains incidents which laymen will not be slow to appreciate.

Simpson Bolland, the well known writer on foundry subjects has just brought out the "Encyclopedia of Founding and Dictionary of Foundry Terms."

John T. Jones, of Iron Mountain, Mich., who is identified with iron mining properties on the Mesabi and Menominee ranges, has been busy for some time with experiments on a process of reducing iron ore by electricity. The work has been carried on at the machine shops of the Ludington-Hamilton property.

PIG IRON COST AT BIRMINGHAM.

The first of a series of five articles by Edmund C. Pechin, on "Iron-Making at Birmingham, Ala.," appeared in the last issue of the *Engineering and Mining Journal*. From being skeptical as to the ability of Southern furnaces to make pig iron at $6.50, Mr. Pechin says that a week lately spent in the Birmingham district has brought him to the conclusion that two concerns at least are now making iron at a cost not to exceed $6.50 per ton of 2,300 lbs., and reductions lately made permit of the shading of this figure. On coming to this conclusion, Mr. Pechin inspected freely Birmingham mines, furnaces and cost sheets. We quote from his article:

"In the six years that have passed since I last visited Birmingham, very marked changes have taken place. The closest attention and economy are apparently now practiced in all departments; appliances to better and cheapen have been introduced; the plants generally are in much better order; competent chemists assiduously watch both materials and products, and, most important of all, the more careful mining and washing of the coal, unwisely neglected in earlier years, have produced a much better coke, resulting in a much lower fuel consumption and larger output of better iron. From the owner's standpoint, one grave omission seems to me to have been made in making up the cost of $6.50, viz., not charging up royalties, coke and ore being put in at actual cost. Therefore, to obtain this low figure, it is essential that the ownership of coal, ore, ovens and furnace plants must be in the same hands. Any furnace going into the open market for these supplies, or either of them, cannot reach the above low figure. The district as a whole cannot make iron at such a price. With a majority of the furnaces running, from 50 cents to $2 must be added as the true cost."

Taking up in this first paper the question of ore supply, Mr. Pechin refers first to the red fossil ore seam, which at Red Mountain, Ala., thickens into a seam 8 to 12 feet thick and even 14 feet. From Grace's Gap to Read's Gap, 12 miles, the bold outcrop of this ore was for years a conspicuous but neglected feature along the crest of Red Mountain. This outcrop ore, holding into the mountain for 300 feet, is granular and friable and known as soft ore. Its average composition is as follows: Iron, 47 to 52 per cent.; silica, 16 to 18 per cent.; phosphorus, .25 to .5 per cent.; alumina, 4 to 5 per cent; carbonate of lime, 1 to 2.5 per cent. "Hitherto the soft ore has been won by first stripping and then raising it, an easy and cheap method with light cover. One of the largest remaining available bodies is at Ishkooda on the left hand side of Grace's Gap going east, on what was the Oxmoor tract, now belonging to the Tennesse Coal, Iron & Railroad Co. The cover here is light, and large areas are stripped in advance, and from 8 to 10 ft. of high grade soft ore is being quarried, a single shot loosening and breaking up many tons. The contract price for stripping up to 30 ft., raising and loading in Louisville & Nashville cars is 37½c. per gross ton; the freight to the furnaces is from 12½ to 17c. a ton."

Following south, long stretches are met where all work has been abandoned, the cover being in some instances 50 feet. Then in turn come stretches of the seam that are still intact, alternating with portions that have been worked out and others which different companies are now working. Several Birmingham furnaces are drawing their moderate supplies of soft ore from Irondale, six miles distant. This ore is 4 ft. to 6 ft. thick, has a dip of about 26° and costs 85c. a ton, f. o. b., with a 25c freight to Birmingham.

"At the present time and for the future," Mr. Pechin says, "the hard fossil ore is and must be the main source of supply for all the furnaces in the district." This ore, he shows, exhibits a radical change from the soft ore forming the outcrop. At a point 300 feet from the outcrop, the hard ore showed 30 to 45 per cent. of iron, as against 47 to 52 per cent. for the soft iron; 7 to 12 per cent. of silica; .8 to 1.5 per cent. of alumina, and 16 to 47 per cent. of carbonate of lime. At the Smith No. 1 mine, which is taken as a representative of the hard ore properties, the main slope is down some 1,500 feet, with extended headings driven on each side. The seam is from 8 to 14 feet thick and will average 9 ft. 6 in. Dynamite is the explosive and all that falls is loaded, as everything goes through a crusher. Taking the ground already proved, 1,200 ft. by 10 ft. in thickness, and each mile of length will give, say, 2,350,000 cu. yds., which at the conservative estimate of 1½ tons to the cubic yard will yield 3,503,000 tons of ore. On a burden of four-fifths hard ore to one-fifth soft, No. 2 Ensley furnace, 18 ft. by 75 ft., has for some time averaged over 190 tons a day (four-fifths foundry) on less than 2,500 lbs. of coke per ton of iron. Mr. Pechin refers to a brown hematite, averaging 51 in iron, that is used in varying percentages, with satisfactory results; but this means higher cost and at the present low price of iron only a small percentage is used. In all the ores of the district sulphur is unimportant.

In the latter portion of the article, Mr. Pechin speaks of the success of Dr. Wm. B. Phillips' experiments for the Tennessee Coal, Iron & Railroad Co., in magnetizing and concentrating silicious red fossil ores. Laboratory experiments on 3,000 lbs., which from 40 per cent. iron and 30 per cent. silica, was brought to 59 per cent. iron and 10 per cent. silica, have resulted in the erection of a Davis & Colby kiln at Bessemer and if this concentration can be carried on on a large scale, and not at too great a cost, millions of tons are available at a very low first cost.

Concluding, the article says: "There has been a current opinion in the North and West, and in which I freely acknowledge I personally have shared, that at the low prices at which they have been selling iron the Alabama furnaces have been losing money and were galloping toward sure disaster, and that when disaster came no one else would dare to take up the fight. Any such belief must be got rid of instanter. Alabama as a big ironmaker is in the ring to stay. The saddest feature about the whole business North and South is that the ores and coals and plants are being used up without any commensurate profit. The sooner the two sections agree to become colleagues in supplying the market, instead of senseless competitors, the better it will be for both. Whether it be good bookkeeping or not, the North must clearly recognize the fact that the ability of Alabama furnaces to make cheap iron is because they get their ores and coals at cost. With a revival of business activity and advancing prices, the cost will advance to the North much faster than to the South, because, in addition to wages, there will come owners' and middlemen's profits to the former."

The coals and coke of the district and pig iron costs will be taken up in later articles.

Sharpsville's Heavy Iron Tonnage.

TO THE EDITOR OF THE IRON TRADE REVIEW:

In looking over "Pittsburg's Great Industries" by J. Morton Hall, member of committee on tranportation and railroads of the Chamber of Commerce, I note the tonnage originating in Pittsburg and Allegheny is placed at 19,125,000 tons. This includes in and out bound. Knowing the tonnage of Sharpsville to be exceptionally large for its size, I was led to make a rough comparison of the tonnage per capita of the two places. The daily output of the active furnaces of Sharpsville will aggregate about 1,100 tons or 400,000 tons per annum. I believe it is customary to consider that the ore, coal, coke and limestone necessary to make a ton of iron, is about three tons.

This would give us a total in and outbound tonnage originating in Sharpsville of 1,600,000. Placing the population of Sharpsville at 3,000 the tonnage per individual would equal about 533 per annum. Placing the population of Pittsburg and Allegheny at 400,000 their tonnage per individual would be less than fifty per annum.

The total railroad tonnage of the United States for 1890 was 656,961,123. If the tonnage of Pittsburg was proportionately as great as Sharpsville, one half of the tonnage of the United States would originate in Pittsburg instead of 19,000,000. If Sharpsville was as large as Pittsburg its tonnage would be over twice the entire tonnage of the State of Pennsylvania, which is placed at about 152,000,000 tons. In consideration of this showing it seems to me Sharpsville is entitled to claim the unique position of contributing the largest railroad tonnage per individual of any town, village or city in the United States and probably in the world. IRON.

SHARPSVILLE, PA., June 27, 1894.

THE Andrews & Hitchcock furnace at Hubbard, O., is expected to go in blast in a few day.

FORMS OF IRON AND STEEL ROOFING.

Since the establishment of the Porter Iron Roofing Co., at Annderson, Ind., to secure the advantages and economies which the gas belt offers, the company have been well supplied with work and the outlook is reported encouraging. The increasing demand for steel roofing and siding is a growing feature of the trade, which has been noted by establishments of this kind and it is manufactured and kept in stock along with the iron and galvinized. Some of the products of the Porter Iron Roofing Co. are illustrated in this connection. Fig. 1 shows their standard crimped roofing, made from steel, about 26 gauge, annealed in a new and improved manner. The sheets are eight feet long and two feet wide, weighing 12 pounds, and are painted on both sides with the best metallic paint. They have a crimp on each edge and can be used on roofs of any size. Fig. 2 shows a center-crimp roofing and siding, the extra crimp being put in the center of the sheet to stiffen it. It can be used on sheathing boards, but is generally employed direct on the rafters, and for siding direct on the studding. It can be used for rolling mills and factories exposed to fire from the inside.

Corrugated iron has been in use for a long time but in the past few years it has become very effective as a covering for buildings through the improved method of annealing iron and through new machinery for making the corrugations. The machinery employed by the Porter company, by pressing the iron into molds, makes a deep and uniform corrugation, with level sheets. Figs. 3 and 4 show the relative size of the corrugations, those of 2½ inches being preferred to the 1¼-inch corrugations, which are generally made from light iron, being employed for ceilings, partitions, etc. The round ridge cap, illustrated in Fig. 5, is used with corrugated roofing, making a complete finish at the comb of the roof.

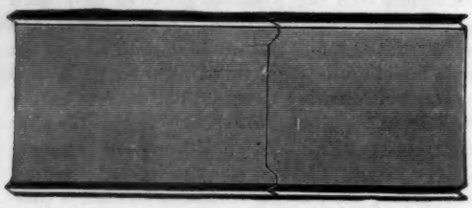


Fig. 1.

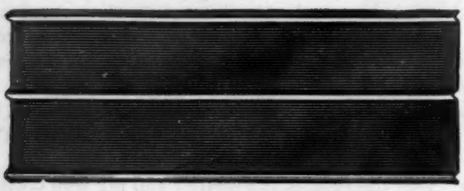


Fig. 2.

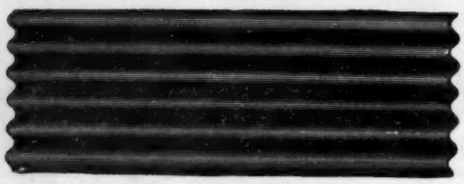


Fig. 3.

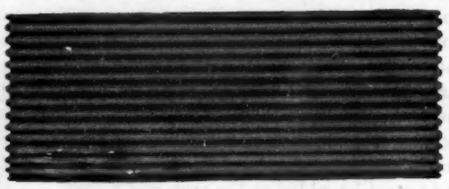


Fig. 4.

Fig. 5.

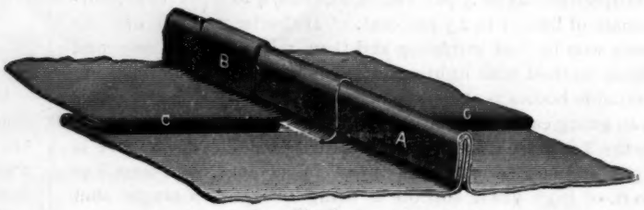


Fig. 6.

In laying the roofing, the sheet is secured to the sheathing by means of the iron cleat, the first curve of which fits over the turned-up edge of the sheet. The cleat is then fastened to the sheathing. The standing seams of the sheets are pressed together with the seamer, and the end of the cleat is turned down over the crimp of the sheet. The standing seam thus forms a cap covering the joints and the sheets are fastened to the roof without any nails being exposed. This form is illustrated in Fig. 6.

The same firm manufacture roll and cap roofing which is effective on roofs of little pitch. It is furnished in rolls. The side seams must be formed on the roof and therefore it cannot conveniently be put on steep roofs. Weather-boarding is manufactured, also, imitating weather-boarding of wood. Eight feet is the usual length of sheet and 24 inches the width, each weather board having a width of four inches.

THE NEW JOHNSON STEEL PLANT.

The engineer of the Johnson Co. has been at work now about one month on the site of the proposed steel plant at Lorain, O. Chief Engineer Barnhart, after the topographical survey was completed, said that the location could not be improved upon, with the Black River on one side and the main track of the Cleveland, Lorain & Wheeling Railway on the other. The furnaces were located near the river. They will cover an area of 500 x 1,500 feet. The steel mills will be a half-mile almost due southeast. and they will cover an area of 1,300 x 2,400 feet. Between them, covering the entire plant, will be the main switch from the railroad, two miles of which has already been built and is operated by the company's own locomotive. The line is now used for hauling materials for the buildings from the railroad. Several miles of branch switches have also been laid out diverging in all directions. Two weeks ago the mechanical engineer arrived from Johnstown. A 50-foot addition was built to the office and a force of men was put on the plans for the machinery to be used in the plant. The main power will be furnished by a 2,000-horse-power engine, an order having been placed for it some time ago.

The company now have 500 men at work and are adding over 100 a week to their force. The men are being paid $1.50 a day and they are paid weekly. Only residents of Lorain and the county are being hired. Work on the buildings was begun last week. The first will be 176 x 96, 30 feet high. The material will be corrugated iron with a truss roof also of the same. The structural iron is being made by the Ferris Co., of Pittsburg, and much of it is already manufactured for shipment. Other buildings to follow will be the cupola house, with three cupolas, the converter, the blowing engine house, the steel mills, with the 3,000-horse power engine, and finally the blooming mill. The plant will be ready to turn out steel in less than a year, and before that time $1,250,000 will have been expended on the plant, and when finished, according to the plans laid out, about $4,000,000 will be the sum expended.

A kindred project is the Lorain Street Railway Co., of which Mr. Johnson and Mr. Moxham are principal owners. The line will run from Lorain to Elyria via the steel plant property. The Johnson Co. are under contract to have it ready for rolling stock in two months. A T rail will be laid. Beside the mills, the company has laid out lots for residences for workmen to the south, and up to what is known as the Standen road. Here the company intends to found a town.

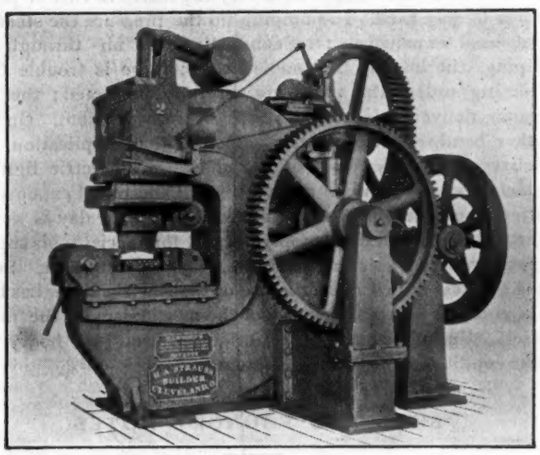
A TIMELY paper on the new cruisers, with particular reference to the "Indiana," is contributed to the July *Century* by Albert Franklin Matthews. There are some excellent illustrations, with clear descriptions of battle-ship-building.

SHAPE METAL CUTTING MACHINE.

One of the most familiar facts in connection with the employment of iron and steel is the extent to which it has entered into buildings, this being due to the rapid improvement in the manufacture of structural iron and steel, and the consequent cheapness of production. Difficulty has been experienced heretofore in cutting structural beams, but Mr. David Hammond, of Canton, O., president of the Canton Bridge Co., has recently invented and patented a line of machinery to obviate all the drawbacks encountered.

By the use of the Hammond shape metal cutting machines all kinds and sizes of structural iron and steel beams can be cut in cross section with rapidity and exactness. By the ingenious devices employed in these machines, the cutting is accomplished without what is known as the shear cut, thus providing machines that will be durable. The webs and flanges of the bars or beams are cut by direct action, thereby preventing the cutting blades from becoming heated by reason of the shear cut. Another objection overcome by these machines is that after a bar or beam has been placed in proper position to be cut, it remains as originally placed, until it is entirely cut, thereby saving the necessity of changing the beam to cut the web and its different flanges. The work is thus more accurately done, and with less labor.

It is to be expected that these machines will find their way into all the large plants manufacturing structural iron and



steel, and in the various shops in which structural iron is used or handled, inasmuch as the work is accomplished with less labor, thereby reducing the expense of production, and at the same time finishing the beams so far as the cutting is concerned, and putting them in proper condition to be placed in a building or bridge.

The machines are calculated to cut cold beams, doing away with the old fashioned process of sawing the beams while hot. There are many places other than the mill, in which it is often desirable to cut steel beams, and by the use of the Hammond machines all kinds and styles of steel beams can be cut to any desired lengths, and with great rapidity. A view of the machine, conveying a good idea of its construction and operation, is given in the accompanying cut.

RAILROAD BUILDING IN 1894.

Certainly nobody has been looking for the present year to make much of a record as a year for railroad building, and probably many will be surprised to learn that there has been more than a nominal amount of new road built. Yet the returns of track laid in 1894 up to July 1, show an aggregate of 495 miles. This is the lowest half year's record that has been reported for years. The total is 530 miles below the new mileage built in the first half of 1893, over 705 miles less than in the corresponding period of 1892, and only a third of the track built in the first half of 1891, when 1610 miles were reported. Though the comparisons with the work done in a similar period of the previous years, which were poor years for railroad building, show plainly how great the decline has been actually, yet the record may be regarded as very fair, if, indeed, it is not to be looked at as an unexpectedly good one, considering the conditions in other industrial fields that have existed for a year past. The obvious explanation is to be found in the location of the lines. An examination of the length of the new lines and the parts of the country where they have been built, makes it clear why nearly 500 miles of railroad have been constructed under such unfavorable conditions. No State has build 100 miles of railroad. The highest total is 54 miles in South Carolina, and this is chiefly contributed by one of the branches of the Atlantic Coast Lines, built to continue the policy of that company to shorten its through route to the South. Colorado is next on the list. That State, which felt first of all and most severely the unfortunate results of legislative errors, with characteristic energy and spirit soon started a new development of her gold mines, and has already built 40 miles of railroad in doing so.

There is not another line of those helping to make up the record which has 30 miles to its credit. The South Jersey Road has built 28 miles to reach a terminal on the coast. The Santa Fe, Prescott & Phœnix, in Arizona, has built 23 miles; the Southern Pacific, 20 miles in Louisiana; the Dry Fork, a new line in West Virginia, 20 miles to reach timber. The Chicago, Burlington & Quincy is now laying track on its extension into Montana, to connect with the Northern Pacific and secure a connection to the Pacific Coast. The immense proportion of this new mileage is made up of what, so far as length is concerned, are unimportant lines, but which are of vast importance in developing the industries of the country. The following table accounts for the new track laid, by States:

Arizona	23	Ohio	43
Arkansas	19	Pennsylvania	30
California	18	South Carolina	54
Colorado	48	Texas	15
Florida	50	Virginia	3
Georgia	8	West Virginia	27
Illinois	4	Wisconsin	24
Louisiana	36	Wyoming	20
Michigan	6		
Minnesota	5	Total United States	495
Missouri	6	Canada	41
New Jersey	35	Mexico	17
New York	2		
North Carolina	19	Grand Total	553

—[Railroad Gazette.

Wear of Blast Furnace Linings.

F. W. Leurman in *Stahl und Eisen*, discussing the question of the lining of blast furnaces, asserts that this lining is worn away: (1) From actual wear produced by contact with the descending charge; (2) by the action of the constituents of the blast furnaces, especially of cyanogen or of its salts; (3) by the action of sodium chloride contained in the coke; (4) by flaking owing to the deposition of carbon from carbonic anhydride, caused by the iron particles formed from the iron pyrites existing within the material forming the lining. The first of these only accounts to a slight extent for the wear actually observed, and although the action of the cynogen of volatile alkaline cyanides is likely to account for a considerable portion of the destruction, yet this still requires experimental proof. The water used for cooling purposes takes up large quantities of cyanides from the walls of blast furnaces, and fused cyanides may even be occasionally observed to drop away from such walls. The third source of wear, the salt present in the coke, is undoubtedly an important cause. Coke ovens are frequently rapidly destroyed by the salt present in the coal coked, the quantity of this salt having in one case, to which the author refers, reached as much as 48½ pounds in the charge of six tons of coal. An examination of the coke recently charged into a blast furnace showed it to contain 0.062 per cent. of sodium sulphate and 0.119 per cent. of sodium chloride, or for 100 tons of coke nearly 140 pounds of the former and over 260 pounds of the latter; and quantities such as these charged daily into a blast would soon exert a marked destructive action on the lining. The fourth cause of wear is a most important one when, as is nearly always the case, the fire-resisting material used in the manufacture of the furnace lining contains iron sulphides. These lead to the formation of metallic iron, which in turn causes the deposition of carbon within the masonry, which then splits away and is destroyed. Mr. Leurman recommends the use of carbon bricks.

F. A. BLACKMER, Benton Harbor, Mich., is in the market for a second hand engine in good repair, of from 40 to 50 horse power.

MACHINE SHOP AND FOUNDRY.

RELATIVE STRENGTH OF CASTINGS AND WOOD

Prof. Robert H. Thurston, in a recent discussion of strength of materials made a number of interesting comparisons. At the outset he gave the following generally accepted figures: Cast iron weighs 444 pounds to the cubic foot, and a 1 inch square bar will sustain a weight of 16,500 lbs.; bronze, weight 525 lbs., tenacity 36,000; wrought iron, weight 480, tenacity 50,000; hard "struck" steel, weight 490, tenacity 78,000; aluminum, weight 168, tenacity, 26,000. We are accustomed to think of metals as being stronger than wood, and so they are, generally speaking, if only pieces of the same size be tested. But let equal weights of the two materials be compared, and it will then be found that several varieties of wood will prove stouter than ordinary steel. A bar of pine just as heavy as a bar of steel an inch square will hold up 125,000 lbs.; the best ash 175,000 lbs.; and some hemlock 200,000 lbs. Wood is bulky. It occupies ten or twelve times the space of steel. The best steel castings made for the U. S. Navy have a tenacity of 65,000 to 75,000 lbs. to the square inch. Whitworth by solidifying such castings under great pressure, got a tensile strength of 80,000 to 150,000 lbs. By "drop forging" no doubt this may soon be paralleled. We now get still greater strength in small pieces.

The best tool steel, from ingots, is far superior to ordinary steel castings and forgings in this respect, and fine steel wires and ribbons give a tenacity of 300,000 lbs. to the square inch of cross section. Ordinary aluminum is only one-third as heavy as steel, and a bar of the former, with a cross section of three square inches, would hold up 78,000 lbs., and that is as much as 1 in. of good steel would do. Various alloys have been made in which aluminum is the chief ingredient, securing increased strength without materially adding to the weight. But Prof. Thurston does not regard any of them nor any of the numerous bronzes as well adapted as steel. Yet Alfred E. Hunt, president of the Pittsburg Reduction Co., said recently that by adding a low percentage of "hardening ingredients" and rolling, his works could produce aluminum plate with a tenacity of 40,000 to 45,000 lbs., without materially affecting the weight. This would give a tensile strength in a bar weighing as much as steel 1 in. square, of about 130,000 lbs. It has been elsewhere stated that Mr. Hunt's company produced aluminum with a strength of 60,000 lbs. to the inch, which would be equivalent to steel having a tenacity of 172,000 lbs.

SPECIAL MACHINE SHOP TOOLS.

An interesting report on special shop tools was discussed at the recent convention at Saratoga, of the American Railway Master Mechanics' Association and while the report had special reference to the work of car shops, it has many points of interest to machinists and machine shop proprietors generally. The reporting committee had paid considerable attention to portable, universal drilling and boring machines. Several excellent portable drilling devices are on the market. The committee found compressed air in use by many members for operating hoists about tools. Little progress seemed to have been made in utilizing electricity in locomotive repair shops and the committee was of the opinion that for various reasons not much will be done in this direction for some time to come. Among special tools the best designs of patented small lathe tools were mentioned as being of particular value, and still little understood. The market contains a number of such tools that are almost worthless, but there are good ones to be had and in special places they are much cheaper than cutting up high-priced tool steel. Another class of tools that can be got up in any shop, but that are still not in general use, are holding bars or stocks. By the use of these the best quality of tool steel can be used at a small cost and the tools worn down to the lowest limit. The matter of convenient and accurate lathe mandrils has not received the attention that it should have. As a number of members had called attention to an expanding lathe mandril and recommended it highly, the committee recommended a particular tool of this description. The discussion of the report brought out considerable comment. Mr. Tongue had two portable shop drilling machines which reduce shop expenses very considerably. These machines are driven by an air motor, and he had compressed air through the shop, roundhouse and car shop.

Mr. McConnell had a great many tools driven by compressed air and made many cheap and reliable tools from gas pipe. He had small tools for grinding driven by compressed air which run 6 inch emery wheels up to 4,500 revolutions. He also used compressed air engines for boring cylinders and drilling around frames. These are often used at night when steam is off. The use of compressed air is extended to a great variety of tools in his shops, and he believed compressed air the coming motive power in machine shops. He had three air compressors and two miles of pipe in the yard, car shop, machine shop, boiler shop and foundry.

Mr. Joughins thought that steam and shafting as a means of distributing power through shops must pass away. He spoke of the applications of electricity and compressed air, and then suggested that a gas engine is another possible motor for such purposes. It is the cheapest mode of generating power that it is possible to obtain. It can be run with illuminating gas if required.

Mr. George Gibbs said that within the last two or three years the use of compressed air has increased enormously, but there is some danger of its being too extensively used. It has many advantages but is very expensive in cost of power when largely used. In pumping up the pressure the steam is not used expansively; in conducting the air through the piping, the loss by friction is heavy; there is trouble from freezing unless the pipes are carefully protected; the efficiency delivered is probably not over 20 per cent. On the other hand, electricity has a wider field of application, and delivers say 70 per cent. of the efficiency. Electric lighting plants are now common and with small additional expense for attendance, these plants can be run through the day as well as through the night, and supply current for special tools such as transfer tables, hoisting machines, staybolt cutters etc. So far the greatest drawback to the use of the electric motor has been the complication and delicacy of the mechanism of the motor itself. Until lately the depreciation has been very heavy, but this condition is fast being overcome.

SHOP AND FOUNDRY NOTES.

A good plan for preserving tools from rusting is the simple preparation employed by Prof. Olmstead, of Yale College, for the preservation of scientific apparatus, and which he long ago published for the general good. It is made by the slow melting together of six or eight parts of lard to one of resin, stirring till cool. This remains semi-fluid, ready for use, the resin preventing rancidity and supplying an air-tight film. Rubbed on a bright surface ever so thinly, it protects and preserves the polish effectually, and it can be wiped off nearly clean, if ever desired, as from a knife blade, or it may be thinned with coal oil or benzine.

* * *

"The stove molders in this city have not been doing as well for the past year as they have previously done," said Mr. J. T. Dugdale, of the Western Stove Mfg. Co., St. Louis, to the *Stoves and Hardware Reporter*. "That is they have been doing just as good work, but there has not been so much work to do, and consequently they have not earned so much money. Other workmen have been in the same position, so that the molders are not the only ones who have suffered from the business depression, and those in St. Louis are no worse off than their fellow-workmen in other cities. But there is another reason why all molders are earning less money than formerly. The molders' scale is as high as it was 20 years ago, but the stove that was made then is a different stove to-day, with more pieces and more work, so that it takes a longer time to complete it. Many of the molders and mounters who found themselves out of work have now procured other employment, which they will not be likely to leave when there is a general resumption at the foundries, and it would not be at all surprising if it would be difficult to procure a full working force when the time comes to begin manufacturing on an ac-

tive scale. That time must soon come, and the question of obtaining sufficient men is apt to prove an important question, and one having a decided bearing upon all branches of the trade. There are not too many stoves ready for the market now, and this is a matter that it is well for every one in the business to consider."

* * *

The *Engineering Magazine* says that the introduction of electric power for operating traveling cranes has extended their use so as to include much yard work where it would formerly have been at least inconvenient to transmit power by other methods, and such cranes have proved themselves to be labor-saving machines indeed. In one instance it has been practically demonstrated that the entire cost of a most extensive system of electric traveling cranes for yard use was more than entirely met by the economy in labor attained in the first year of their use. "This example clearly proves what has already been asserted without such conclusive proof, *i. e.*, that in America at least human muscle is too expensive to compete with mechanical power. It may not be amiss to remark that the employment given to the workmen engaged in building the cranes is a new field of labor which would otherwise not have existed, and also that any devices which tend to abolish the use of men for purely animal work, while also creating employment in a much higher grade of service, must ultimately tend to the advantage of the workman, whatever may be the immediate hardship wrought to those who are displaced at the time when the machines are introduced."

* * *

Henry Harrison Suplee, writing of friction clutches, says that the importance of having some positive yet gradual method of imparting motion in power transmission, has led to the designing of the numerous forms of clutches in use, yet in his opinion the perfect clutch is yet to be made. For positive engagement or complete release there are many forms that may be operated with entire success, "but when a heavy power may suddenly be thrown against a great resistance, and that too without the operator being able to exercise any proportional degree of judgment as to the graduation of the engagement, it must be admitted that there is room for the exercise of much inventive ability." The shifting belt, with fast and loose pulleys is one of the best devices for this work, imperfect as it is, and in many sawmills a slack belt, gradually tautened up to its work by a tightening pulley, has been found the most practicable method for use with wide, short belts. "The difficulty with all such actions," the writer says, "lies in the fact that, in the engagement of the driving parts, the control of the gradual increase of motion, upon which the smoothness of action depends, has not that degree of certainty which enables the element of human judgment to be entirely omitted. The perfect clutch should, so to speak, 'weigh its load,' and so give automatically just such proportion of time to the engagement that the shock upon all parts of the transmission to which it belongs may be that which has been predetermined by its designer, regardless of the variations in its load, or of the suddenness with which it is thrown into gear."

THERE is at present being constructed at Constantinovka, in South Russia, a large iron and steel works with a capital of $2,000,000 by the Donetz Forges Co. The works will include a large Bessemer steel making plant, a rail rolling mill, foundry, forge and an engineering shop. The plant will, it is expected, be put in operation this year, and it is stated that orders have already been secured for the supply of 100,000 tons of rails to the Russian state railways during 1895, 1896 and 1897.

AT Youngstown, O., it is reported that 1,300 families are suffering for the necessaries of life and the public relief fund is exhausted. The slackness of work in the iron mills following upon the long shut-down last year is falling with increasing severity on some families whose savings have long since been exhausted.

AT Muncie, Ind., the Midland Steel Works, Indiana Iron Co.'s mills, and the plants of the Muncie Iron & Steel Co. and the White River Iron & Steel Co. closed down June 30, without signing the scale. The week is expected to develop the intentions of the companies.

JOHN CHINAMAN'S STEEL MILL.

We noted a year or more ago that John Chinaman was about to try his many hands at rolling mill pursuits. A recent report by one of the American consuls to China gives details showing that progress is being made in the erection of the first plant at Hankow. This plant is to cost $4,500,000; the foundations are down, and the machinery is delivered, though at last accounts had not been set up. Railway material will be the chief product, and English mill men are engaged to teach the Chinese idea how to develop millwards. The English engineer in charge, Robert White, went out to Hankow a year or two ago to look after the general engineering details of this establishment, accompanied by a Mr. Johnson. Both had been employed at the West Cumberland steel works, under G. J. Snelus, the former as engineman in the Bessemer department and the latter as draughtsman. The London *Iron and Coal Trades Review* has recently seen a letter from Mr. White in which he says they have just completed what will be the first full-equipped establishment of its kind in Chinese territory, including blast furnaces, Bessemer works, puddling furnaces and a rolling mill. The general management of the enterprise is in the hands of M. Braive, a Belgian, who has apparently taken good care that his own country shall have the lion's share of the orders for machinery and plant.

We should have fancied that American rolling mill and blast furnace contractors would have had a finger in this big pie. They certainly understand the designing and construction of work of this character at least equal to European engineers. However, it is unimportant who builds for John Chinaman as compared with what will be the outcome when in his land of super-cheap labor he shall have large mill capacity erected. The present iron and steel producing countries will then be forced to adopt clean-cut laws to protect the home industry—and, we may reasonably add, they cannot be too quick in getting themselves in shape to keep John Chinaman's product at double arm length. According to the account of the American Consul (which was written a year ago) the fuel and ore supplies are inexhaustible, and means of development have been under way for some time. Beware of John Chinaman, whose laborers can live on twopence a day and who is compelled to do as the emperor wills. He will be along this way in a few years.—[National Labor Tribune.

The London *Engineering Review* has this paragraph on the enterprise above referred to: "Coke for the blast furnaces has been imported from Antwerp, but whether it is of English German or Belgian origin is not stated. The Viceroy, it is added, wants to let the Emperor see that he can make iron and steel in China, but it is likely that, as the establishment is a very large one, it will require a lot of English, or, at any rate, European supervision to begin with, English manufacturers might be apt to tremble at the prospect thus opened out of Chinese competitton in the iron industry at home and abroad but the dream of an invasion of Chinese cheap labor is not yet about to be realized, if our correspondent is right in his estimate—based, of course, on actual experience on the spot—that one Englishman can do as much as five Chinamen, while they have as yet everything to learn about manufacturing iron and steel. The ore deposits from which supplies are drawn for the furnaces are sixty miles down the river from Hankow, and although coke is brought to the spot from Europe, at present it is more than likely that the latter arrangement will be only temporary.

Home Ores More Attractive.

The published report that "negotiations for the purchase of the interest of the Pennsylvania Steel Co. in the Juragua mines of Cuba by the Bethelhem Iron Co. have been closed, and that the latter company now owns the entire property," is not correct. The sale of the Pennsylvania Steel Co.'s interest in these mines has been talked about as a possibility and as a means of assisting in its reorganization, but it has not been made. The Bethlehem Iron Co. is certainly not a bidder for the property. It is, on the contrary, greatly impressed by the cheapness of Mesabi ores and by the wonderful developements which are now taking place at Mr. Edison's Ogden mines in New Jersey, where giant ore crushers and magnetic separators are effecting a revolution of immense proportions in the cheap production of iron ore of the purest quality.—[Bulletin.

INDUSTRIAL SUMMARY.

New Enterprises:—

The following recent incorporations, specially reported for *The Iron Trade Review*, are of interest to the iron and machinery trades:

Peoria, Ills.—Diamond Electric Co.; capital, $60,000; for the manufacture and sale of all kinds of machinery and electric appliances; incorporators: Jno. H. Francis, Wm. E. Francis, Gustav A Scheeffar. Address letters care of Stevens & Horton, Peoria, Ills.

Rochester, N. Y.—The Electric Boiler Co., of Rochester, N. Y.; capital, $50,000; for manufacturing steam and water heating boilers; incorporators: J. H. Howe, Wm. T. Bassett, Chas. S. Hopkins, Rochester, N. Y. Address letters care of Jno. T. Kinney, Rochester, N. Y.

New York City, N. Y,—Anti Slip Horse Shoe Co.; capital, $100,000; for manufacturing horse shoes; incorporators: Emil Rinke, 45 W. 4th st.; F. W. Bach 312 W. 123d st.; Adam E. Schatz, 61 Park Row, N. Y. City, N. Y. Address letters care of Adam E. Schatz, 61 Park Row, N. Y. City, N. Y.

Buffalo, N. Y.—The Ellicott Electric Heating Co.; capital, $25,000; for manufacturing machinery, generators, motors, lamps, etc.; incorporators: Chas. W. Pardee, Jno. N. Scatcherd, Daniel O'Day, Buffalo, N. Y. Address letters care of Rogers, Locke & Milburn, 28 Erie st., Buffalo, N. Y.

N. Y. City, N. Y.—Barriett Electric Motor & Dynamo Co.; capital, $20,000; for manufacturing electrical motors and dynamos; incorporators: Jno. R. Anderson, Montclair, N. J.; Frank Adams, 201 W. 27th st.; Georgie Barriett, 475 Amsterdam ave., N. Y. City, N. Y. Address letters care of A. C. Shenstote, 111 Broadway, N. Y. City, N. Y.

New York, N. Y.—York Structural Steel Co.; (incorporated in W. Va.) capital, $1,000 min., $1,000,000 max.; to manufacture purchase, lease, etc., various products of iron ore, patent rights, etc., pertaining to manufacture of any products of iron ores; incorporators: S. T. McCabe, Benj. S. Harmon, N. Y. City, N. Y., Jas. S. Bach, Orange, N. J. Address letters care of Benj. S. Harmon, 45 William st., N. Y. City, N. Y.

New Buyers in the Market, and Some of Their Wants:—

[If you are in need of machinery of any description, please notify *The Iron Trade Review* and we will put you in communication with our advertisers at once.]

Chapman & Goble, of North Baltimore, O., who are about to erect a woodworking plant at Sutton, W. Va., are in the market for iron roofing.

D. Y. Williams of South Haven, Mich., is in the market for steel beams, 4″ width of flange, ⅜″ thickness of web and weighing 8 to 10 pounds to the foot.

New Construction:—

Contracts have been let for the rebuilding of the Poultney Foundry & Engineering Co.'s plant at Youngstown, O., which recently burned down.

G. W. Beggs & Co. are arranging for the establishment of a plant at Bessemer, Ala., to make soil pipe and sanitary castings, and employing 75 men.

The Escanaba Iron Works, Escanaba, Mich., have begun the erection of a foundry 40x50 feet, and when it is complete will equip it with the latest appliances.

The L. K. Hirsch Co. of Chicago have closed a contract with the Chicago Heights Land Association for the location and establishment of their factory at Chicago Heights. Excellent railroad facilities are provided. They will manufacture railway spikes, nuts, bolts, washers and other railway supplies and appliances.

The contract for rebuilding the iron works of the Ellis & Lessig Steel & Iron Co., at Pottstown, Pa., to displace those destroyed by fire on June 10, has been awarded to Cofrode & Saylor. The old mills were wooden structures; the new ones will be iron, and are to be completed by September. The buildings include the nail plate mill, 150 ft.x60ft., with rotary shear house, boiler house, lathe house and merchant mill.

Preparations are under way for the building of the steel plant to be established at Bessemer, Ala., by H. F. De Bardeleben and his associates. Col. A. M. Shook, of Nashville, Tenn., will be the general manager, and is about to move to Bessemer. Mr. Hartshorne, of the Carnegie Steel Works, has been in Bessemer recently with Mr. De Bardeleben, investigating the best site for the plant. It is reported that Mr. Hartshorne will supervise the construction work.

Additions, Enlargements, Removals, Etc.:—

The Novelty Iron Works, at Sioux City, Ia., are building an addition to their works.

Negotiations are nearly completed for the removal of the Thomas Malleable Iron & Brass Co., of Milwaukee, to Waukegan, Ill. The latter town is raising $16,000 as a bonus for the firm.

The Detroit Foundry Equipment Co. have changed their name to Whiting Foundry Equipment Co. They have removed their main office to 225 Dearborn st., Chicago, and have occupied their new works at Harvey, Ill. Correspondence should be addressed to the Chicago office.

The Youngstown, O., Chamber of Commerce is making a strong effort to have the National Water Tube Boiler Co, of New Brunswick, N. J., remove to Youngstown. The plant of the company is in the central part of New Brunswick and the company are reported to be looking for a location that would give them more room, as well as other advantages. The National company are now putting in several large boilers for the Ohio Steel Co. at Younstown.

Fires and Accidents:—

At Louisville, Ky., Bridgeford & Co.'s foundry was damaged to the extent of $20,000.

The foundry of Armitage, Herschell & Co., North Tonawanda, N. Y., was damaged by fire on June 22.

The Vineland Iron Foundry, at Vineland, N. J. operated by the Parker-Norton Co., burned last week; insurance partial.

T. B. Rohrman's brass foundry, Philadelphia, was damaged by fire on June 23. The loss is $2,000, which includes a large number of patterns.

A fire in the annealing department of the Millvale Iron Works of Rollings, Moore & Co., at Pittsburg, did $5,000 worth of damage. In April the same works had a $10,000 fire.

General Industrial Notes:—

Carrie Furnace No. 2 at Rankin, Pa., is about to go in blast.

Edgar Thomson Steel Works, at Braddock, resumed last week.

The Falcon Iron & Nail Co., of Niles, signed the Amalgamated Association wage scale last week.

Five miles of iron pipes will be required for the plumbing of the new Carnegie building at Pittsburg.

It is reported that the National Lathe Tool Co. of Philadelphia are negotiating for a branch at Cohoes, N. Y.

The wages of the Harrisburg (Pa.) Rolling Mill Co.'s puddlers were increased from $2.50 a ton to $2.75 July 1.

The Howard Harrison Pipe Works, of Bessemer, Ala., have begun work on a 7,000-ton order of 36-inch pipe for Rochester, N. Y.

The Bay View mills of the Illinois Steel Co. have shut down for repairs after which the scale will be signed and work resumed.

The Westinghouse Machine Co. are now paying the regular quarterly dividend of 1½ per cent. on the preferred and common stock.

The Tennessee Coal, Iron & Railway Co. will put one of its Ensley furnaces in blast at once and the other three in the near future.

The Portage Iron Works, at Duncanville, Pa., and the Hollidaysburg Iron & Nail Co.'s mill in the same county have resumed.

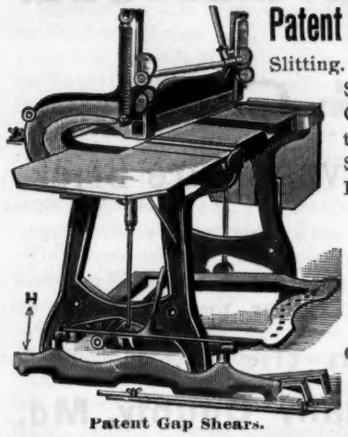
At Baltimore, the McShane Mfg. Co., brass founders, have given their employes a 10 per cent. advance in view of their improved trade.

The two Coleman furnaces at Lebanon, Pa., now the property of the Lackawanna Iron & Steel Co., are being put in shape to blow in.

The Rome Rolling Mill, Rome, Ga., was sold at public sale to Harper Hamilton for $2,700. It will be put in operation at once on cotton ties.

The rolling mills of the Columbia and Susquehanna iron companies at Columbia, Pa., resume operations July 5, after an idleness of five weeks.

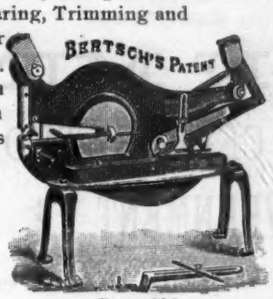
MACHINES FOR WORKING SHEET METAL



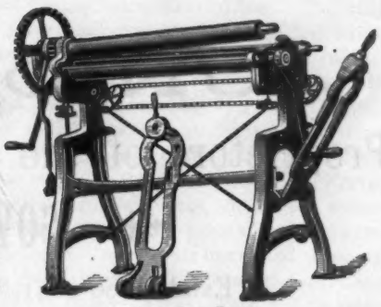
Patent Gap Shears.

Patent Gap Shears, Especially designed for Squaring, Trimming and Slitting. 6 to 18 inch throat for Slitting Wide Sheets. Complete for Tin or Iron to 14 gauge. Seven Styles of various lengths HAND AND POWER

General Purpose Punch and Shear. Seven Sizes.



Rear Side.


Forming Rolls.

General Purpose Forming Rolls, all sizes. Quickly adjusted and instantly opened—A Revolution. Also Patent Crimping Rolls. Beware of Infringements.

BERTSCH & CO., Cambridge City, Ind.

Bucyrus Steam Shovel & Dredge Co.,

—MAKERS OF—

STEAM SHOVELS In Five Sizes for Railroad and Contract Work, Brick Yards, Stone Quarries, Stripping and Handling Iron Ore, Coal, Etc.

STEAM DREDGES Of All Types and Sizes; for All Purposes; Elevator, Dipper, Clam Shell, Suction. Special Machines for Special Work.

WRECKING CARS BOTH HAND AND STEAM. CAPACITIES 10 TO 35 TONS.

PILE DRIVERS WITH EITHER DROP OR STEAM HAMMERS.

SOUTH MILWAUKEE, WIS., or BUCYRUS, OHIO.

THE GARDEN CITY SAND CO., Suite 1015 Security Bldg, CHICAGO, ILL.

FIRE BRICK, FIRE CLAY,

For Blast Furnaces, Cupola Lining, Boiler Setting, Smoke Stack Lining, or Any Other Purpose.

EVERY CLASS OF SPECIAL SHAPES AND SIZES.

ALL KINDS OF

Foundry Supplies.

FACINGS, BLACKINGS AND MOULDING SANDS

Of All Kinds.

At Harriman, Tenn., the rolling mill plant of the Lookout Iron Co. has been sold and the Harriman Iron Co. has been organized to put it in operation.

A strike of the employes at Baldwin & Graham's Stove Works, New Castle, Pa., has been settled by the men agreeing to accept a reduction of 5½ per cent.

The Vulcan Iron Works, Wilkes-Barre, Pa., have purchased the plant of the Allen machine shops, at Tamaqua, and will operate them as an annex to the main works.

Arrangements have been made for starting the Raney & Berger furnace, at New Castle, Pa., and it is expected that the Rosena and Atlantic will resume within the next two weeks.

The Elliott Car Co., of Gadsden, Ala., which bought the plant of the Bluffton, Ala., Car Wheel Works, transferred 36 car loads of machinery and material from Bluffton to Gadsden.

The Clonbrock Steam Boiler Works, Brooklyn, N. Y., have closed a contract for a battery of boilers aggregating a capacity of 4,000 h. p., with the Edison Electric Illuminating Co., Brooklyn.

The large 66-inch shell cupola which has been added to the plant of the Radford Pipe & Foundry Co., Radford, Va., will be of Whiting patent make, manufactured by the Whiting Foundry Equipment Co., Chicago.

Extensive improvements are being made in the plant of the McCullough Iron Co., at Northeast, Md. Several oil-burning furnaces are being put in, and a tank to hold 25,000 gallons is under construction to supply oil to the furnaces.

Eight Whiting overhead floor cranes, two fitting cranes and a complete distributing train for molten iron and wheels, are included in the equipment contract recently given the Whiting Foundry Equipment Co., of Chicago, by J. H. Bass, of Lenoir City for his car wheel foundry.

The steel plant of Jones & Laughlins, Pittsburg, has shut down, the firm not having signed the Amalgamated scale. Conference between the company and its employes have been held within the week, to adjust wages to the extensive tonnage-increasing equipment recently put in.

James E. York, manager of the Ironton steel works at Duluth's suburb, has returned from an Eastern trip and says that the money necessary for enlarging the works has been secured. It is expected that 300 men will be employed. The company will figure on some important contracts for elevated road extensions.

Car building work reported by the *Railroad Gazette* includes 2,000 cars for the Lehigh Valley Road, equally divided between the Buffalo Car Co., and the Lebanon Mfg. Co. The Maine Central road is in the market for 900 cars. The Harvey Steel Car Works are repairing 300 refrigerator cars and the Union Car Works have 100 cars on hand to be rebuilt.

At Chicago a considerable tonnage of material is held off the market for a time by an injunction that restrains the Lake Street Elevated Road from proceeding with the construction of its down-town loop. It is charged that the Lake Street Road has exceeded the authority given it; that it has no legal existence and that it has occupied the site for its loop without proper condemnation proceedings.

The Cleveland Twist Drill Co. have just shipped three of each size of their grip sockets to the Norfolk Navy Yard.

MOUNT SAVAGE FIRE BRICK.

UNION MINING CO.,

Proprietors of the CELEBRATED Mount Savage Fire Brick.

GOVERNMENT ⁂ STANDARD.

Established 1841. Capacity, 60,000 Per Day; 18,000,000 Per Year.

The First Manufactory of its Kind in the U. S.

Home Office and Works:—MOUNT SAVAGE, Allegany County, Md.

Branch Offices:—No. 1 Broadway, New York, N. Y.; No. 222 So. Third St., Philadelphia, Pa.; Lewis Block, Pittsburgh, Pa.

Fire Brick.

High Grade Fire Brick for Melting, Heating and Blast Furnaces.

CUPOLA LININGS, BOILER SETTINGS AND ALL PURPOSES FOR WHICH FIRE BRICK ARE USED—ALL SHAPES.

Ground Clay in Bulk or Sacks. Send for list of shapes.

THE AMERICAN FIRE BRICK & CLAY CO., Mineral Point, Ohio.

When you write to firms advertised in our columns, please mention the fact that you took their address from our paper. They will thank you for it.

This is the third navy yard that has been equipped with these grip sockets, which the Cleveland Twist Drill Co. have lately put on the market. Many of the largest manufacturers throughout the country have adopted them for their works and the makers are pushed to keep up with their orders.

The Pittsburg Testing Laboratory, Limited, has removed its Chicago office from the Rookery building to 1628 Monadnock Block. Mr. T. L. Condron is in charge of the department of bridge and structural material, and Mr. Frank B. Ward, late of Frank Ward & Co., is in charge of the department of rail inspection. The company has more business on hand at present than it has had at any one time during the last three years. Much of it is the inspection of material for buildings.

It is reported probable that the Hubbard Co-operative Iron Co., of Hubbard, O., will surrender its lease of the Hubbard mill and discontinue business. The inventory recently completed shows that there will be a surplus of about 25 per cent. to be paid to the stockholders out of the 50 per cent. of their wages retained in the office to be used as a working capital. This showing of capital on hand is not generally satisfactory to the men, hence the probability that the mill will remain long idle, unless put in operation by the Mahoning Valley Iron Co.

The Western Iron & Steel Co., of Tacoma, Wash., has been organized with a capital of $100,000 to operate at Lakeview, a suburb of Tacoma, the rolling mill which the company recently purchased from the Burlington (Ia.) Iron Co. Foundations are to be built at once and necessary buildings constructed at Lakeview and the mill will be put in operation as soon as it can be moved. P. M. Joyce, of Youngstown, O., has taken stock in the new company and is in charge of the work of removal. H. G. Hamilton, also of Youngstown, has an interest also and will devote himself to the new enterprise.

The Totten & Hogg Iron & Steel Foundry Co., Pittsburg, are running their plant night and day, and have enough orders on their books still unfinished to keep them running the same way for three or four months longer. The orders are all for tin plate work. They have just shipped to the Cumberland Steel & Tin Plate Co., three 24″ hot mills, with rolls all complete; to the Irondale Steel & Iron Co., three hot mills, with rolls all complete, two doubling shears and one trimming shear. Last week they closed another contract with the same parties for four 24″ hot mills with rolls all complete, and a 600 horse power Ætna engine, with double counter shafts and gears, boilers of sufficient capacity to furnish steam for the engine, four doubling shears, and two trimming shears. They have also closed a contract with the Montpelier Sheet & Tin Plate Co., for four 24″ hot mills and four 20″ cold rolling mills, with rolls all complete, and one of their new improved 38″ roll lathes.

THE sharp competition that jobbing foundries have given each other in the past few months has brought finer castings, smoother and freer from defects than before, without increasing their cost—indeed, the rule has been with some foundrymen, finer castings and lower prices. The S. Obermayer Co., of Cincinnati, offer in this emergency and to meet this demand, their pure East India plumbago, graphite or silver lead, claiming that while the original cost is a little more than of ordinary facings and blackings, the economy in dressing and cleaning castings will more than pay for the difference.

Seashore Excursion Over the Pennsylvania Short Lines.

Low rate round trip tickets to Asbury Park will be sold via Pennsylvania Short Lines July 7, 8 and 9, account National Educational Association meeting. Asbury Park adjoins Ocean Grove, Long Branch, Cape May, Atlantic City, Elberon, Sea Isle Park, Barnegat and other delightful watering places on the New Jersey coast, to all of which the Pennsylvania Lines form the only route comprised by one railway system. Return limit on excursion tickets will be ample for side trips. For any desired information apply to nearest Ticket Agent of the Pennsylvania Lines, or address F. Van Duzen, Chief Assistant Passenger Agent, Pittsburg, Pa.

WHILE in the United States about 60 per cent. of all the street railroads are worked electrically, representing about 7,500 miles of road with about 17,000 cars in use, there are, at the present time, in operation in Europe only about 260 miles of electric street railroad, with an equipment of 720 cars. These are divided up among about 50 different companies. A number of roads, however, are now under construction, and will help somewhat to swell this meager total.

The Commonwealth Iron Co. has made a recent sale of a considerable amount of its Badger ore and it is expected that the working force at the mine will be increased to 200 men.

Reduced Rates to Denver.

Unusual low-rate excursions are being announced this year by the Pennsylvania Lines, and long distance journeys over them may be made at slight expense. For this summer exceedingly cheap excursions to Denver will be run over these lines. The rates will be the lowest in effect for years and will enable persons to visit the West at slight cost. The dates and return limits for these special Denver excursions will be as follows:

On July 20th and 21st, good to return until the latter part of August, account the meeting of the Mystic Shrine Order.

On August 9th and 10th, account annual meeting League of American Wheelmen, good returning until the middle of September.

Although the low rates have been made for meetings of organizations, the sale of tickets will not be confined to members, but the public generally may take advantage of the low fare. The return limits will be ample for side trips in the West. Details may be obtained by applying to any ticket agent of the Pennsylvania Lines, or by addressing F. Van Dusen, Chief Assistant General Passenger Agent, Pittsburg, Pa.

For the Christian Endeavor Convention,

At Cleveland, the Nickel Plate Road offers a rate of one lowest first-class fare for the round trip and a splendid passenger service. Tickets on sale July 9, 10 and 11. Return limit Sept. 15th.

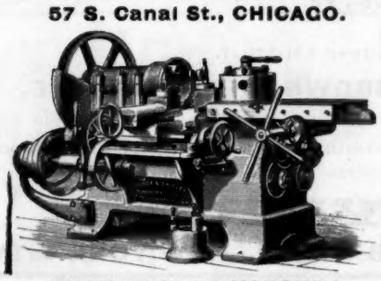
Mountain and Ocean Resorts of the East

Are readily reached via Pennsylvania Short Lines. The only route to Cresson and other cool retreats in the Alleghenies. Solid vestibule trains daily over these lines to Cresson and Altoona, run through to New York, where connection is made for the White Mountains, the Adirondacks, Mt. Desert Island, and places of summer sojourn in the mountains of Eastern New York, Vermont, New Hampshire and Maine. At New York connection is also made for Fall River, Newport, Narragansett Pier, Martha's Vineyard, Nantucket, and famous watering places along the Atlantic, to which passengers via Pennsylvania Lines have choice of all-rail route or palatial steamers of the Fall River Line from New York. Atlantic City, Cape May, Long Branch, Ocean Grove, Asbury Park and summer havens along the New Jersey Coast, are on divisions of the Pennsylvania System, which comprises the most desirable route to them. Any desired information will be cheerfully furnished by ticket agents of the Pennsylvania Lines, or may be obtained by addressing F. Van Dusen, Chief Assistant General Passenger Agent, Pittsburg, Pa.

Linwood Park, Vermillion, O.

As a delightful Summer Resort located on the shore of Lake Erie and during the summer season from June 15th to September 20th, the Nickel Plate Road offers reduced rates to that point.

Dawson & Goodwin,
57 S. Canal St., CHICAGO.



DEALERS IN NEW AND SECOND-HAND
MACHINE TOOLS.
We carry in stock a full line of
Milling Machines, Turret Machinery,
Engine Lathes, Iron Shapers,
Iron Planers, Drill Presses.
Write for Catalogue and Prices. 3

UNION ELECTROTYPE FOUNDRY
TELEPHONE 2130
829 SHERIFF ST. CLEVELAND O.

Business Opportunity

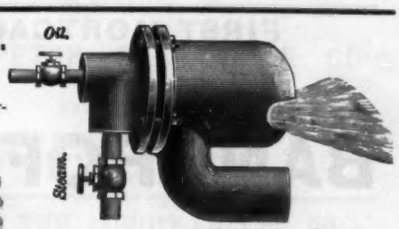
Wanted a man with from $15,000 to $20,000 to invest in a good paying manufacturing business, with or without active participation in the management. This business is open to full inspection, and is old and well-established, with a good paying trade.

Address Box 202,
IRON TRADE REVIEW,
1141 Monadnock Blk,
CHICAGO.

FUEL ECONOMY
SMOKE PREVENTION
IF YOU WANT TO KNOW ALL ABOUT
THE VERY BEST FURNACE IN THE
WORLD FOR ANY STEAM BOILER
Send for Illustrated Descriptive Pamphlet
ON MECHANICAL STOKERS FREE
THE BRIGHTMAN STOKER CO.
CLEVELAND OHIO.

THURMAN FUEL OIL BURNER CO.
Gen'l Offices, 35 and 36 Cordova Bldg.,
INDIANAPOLIS, IND.
Acknowledged the best for Boilers, Forges, Furnaces, Ovens, etc. Write for Catalogues.

BURNER NO. 6.



BURNER NO 4.

E. A. BOLDT, Sole Agent, Eastern States,
320 and 322 Broadway, New York, N. Y.
J. POWER HELY, Chicago Manager,
1405 Monadnock Block, Chicago, Ill.
NOTE.—If you are using oil as fuel, and are not getting good results, we would be pleased to send you our burners on trial. The oil in our burners can be atomized by either steam or air.

EAGLE BRAND THE BEST.

NO TAR. **ROOFING** NO TAR.

It is superior to any other roofing, and unequaled for House, Barn, Factory, or out-buildings; it costs half the price of shingles, tin or iron; it is ready for use and easily applied by any one; it is the best roofing in the market, in durability, to all others. Send for estimate, and state size of roof.

RUBBER PAINT.

The best known paint in the world for tin, iron or shingle roofs, fences, sides of barns and out-buildings. It costs only 60 cents per gallon in barrel lots, or $4.50 for a 5-gallon tub. Color, dark red. It will stop leaks in tin or iron roofs that will last for years. It is guaranteed not to peel, crack, scale, nor wash off and is fire-proof against sparks. TRY IT.

EXCELSIOR PAINT & ROOFING CO.,
155 Duane Street, New York, N. Y.

MOTOR-DRIVEN RADIAL DRILL.

FIRST MORTGAGE 15-YEAR SIX PER CENT. GOLD BONDS
WITH SINKING FUND
OF THE

BLUE RIDGE IRON COMPANY

OF VIRGINIA.

BLUE RIDGE IRON COMPANY. } CONSOLIDATED.
CRESCENT IRON COMPANY. }
LILY AND CRESCENT MINES.

Dated March 31st, 1894. Due April 1st, 1909.

Interest Payable April and October.

GUARANTEED TO APRIL 1st, 1899

—BY—

THE FIDELITY AND DEPOSIT COMPANY OF MARYLAND,
TRUSTEE FOR BONDHOLDERS.

Both Principal and Interest payable in Gold Coin at the office of the Trustee, Baltimore, Md.

TOTAL BONDED DEBT, $50,000.00. **CAPITAL STOCK, $300,000.00.**

GENERAL OFFICES: EQUITABLE BUILDING, BALTIMORE, MD.

Mines and Local Offices: Stanley, Page Co., Va.

Bonds Issued to Improve Mines and Increase Output.

OVER 1,000,000 TONS, ESTIMATED, HIGH-GRADE BROWN HEMATITE ORE.

N. & W. Ry. at Mines, Connecting Direct to the Great Iron and Steel Manufacturing Centres of Virginia, Pennsylvania, Ohio and Maryland. For Prospectus and Description, with Expert Analysis of Ores, Address

ANDREW MAYER,
Investment Banker, 18 Wall St., NEW YORK CITY.

FIRST MORTGAGE 25-YEAR SIX PER CENT. GOLD BONDS
WITH SINKING FUND
OF THE

BANCROFT COAL COMPANY

OF WEST VIRGINIA.

Dated March 31st, 1894. Due April 1st, 1919.

Interest Payable April and October.

GUARANTEED TO APRIL 1st, 1899

—BY—

THE FIDELITY AND DEPOSIT COMPANY OF MARYLAND,
TRUSTEE FOR BONDHOLDERS.

Both Principal and Interest payable in Gold Coin at the office of the Trustee, Baltimore, Md.

TOTAL BONDED DEBT, $75,000.00. **CAPITAL STOCK, $100,000.00.**

Mines and Offices: BANCROFT, PUTNAM COUNTY, WEST VIRGINIA.

Six hundred acres; 5 ft. Average Thickness of Coal; 2,250,000 tons Famous Kanawaha Coal.
Bonds Issued to Improve Property and Increase Output, exclusively.
Present Output, 250 tons per day. Water Transportation to Limitless Markets.
Send for Prospectus, and full Description and Report of Mines.

ANDREW MAYER, 18 Wall St., New York City

—FOR—

JESSOP'S STEEL Tools, Drills, Dies, etc.

Established over a Century ago. Manufactory, SHEFFIELD, ENGLAND.
CHIEF AMERICAN OFFICE, 91 JOHN ST., NEW YORK.
WM. JESSOP & SONS, Limited.
"Medal—World's Columbian Exposition, 1893."
All sizes carried in stock by The W. Bingham Co., Cleveland, Ohio.

CRUCIBLE STEEL CASTINGS

WHY?

Why send your **PATTERNS EAST** and wait **FOUR WEEKS** for your **CASTINGS** when you can get

SOLID STEEL CASTINGS

at home **PROMPTLY.**

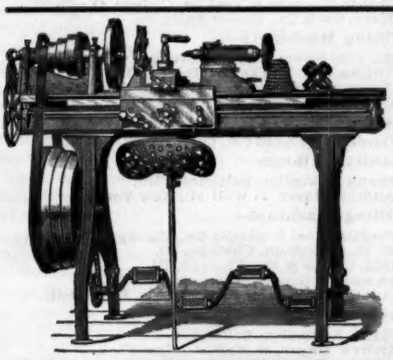
ANSWER **THE KING & ANDREWS CO.,**
218 N. UNION ST., CHICAGO, ILL.

UPRIGHT DRILLS

7 SIZES. LATEST DESIGNS.

We show a better record than all other houses combined. Let us tell you all about it.

BICKFORD DRILL & TOOL CO.
35 Pine Street,
CINCINNATI, OHIO.



Foot Power Lathes

For Electrical and Experimental Work.
For Gunsmiths and Tool Makers.
For General Machine Shop Work. (1)

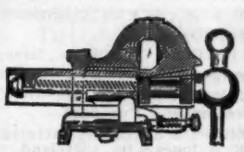
High grade Tools; correct in principle, elegant in design, superior in construction. THE BEST FOOT-POWER LATHES MADE. Send for catalogue and prices.

W. F. & JOHN BARNES CO.,
191 Ruby St., Rockford, Ill.

VISE.

Patented Dec. 27, 1892.
IT HAS QUALITIES THAT ARE UNDISPUTED.

Rapid, Active, Prompt.
One movement in and out, one turn of the hand and the work is secured.



The Capital Machine Tool Co., AUBURN, N.Y.

The advertiser who has kept on the hunt for orders through all the months of lessened trade has been rewarded in the larger share that has come to him of going business.

IT IS PLAIN

that there are more orders now being placed for power-generating equipment, power transmitting machinery, machine tools and foundry apparatus and supplies than at any time since the panic, and while the advance is not to be rapid it is not likely to be interrupted.

The prestige and increasing circulation of **The Iron Trade Review** makes it a valuable adjunct to manufacturers who propose all the time and in all effective ways to push for trade.

THE IRON TRADE REVIEW CO.,
27 Vincent Street, CLEVELAND, O. -:- 1141 Monadnock Block, CHICAGO, ILL

J. J. THOMAS, Sup't. ..... D. D. DAVIS, Mgr.

OAK HILL FIRE BRICK & COAL CO., MANUFACTURERS OF

SUPERIOR FIRE BRICK
Of all Shapes and Sizes.

GROUND CLAYS A SPECIALTY. **Oak Hill, Ohio.**

SECOND HAND!

14x6 Ames Lathe, rise and fall carriage with chuck.
16x6 Prentiss Lathe, complete.
18x6 New Haven Lathe, screw feed.
15x6 Lodge & Davis Turret Lathe.
15x6 American Tool Co. Square Arbor Fox Lathe with slide rest and chuck.
16x16x4 ft. Pease Planer.
18x18x4 Putnam Planer.
24x6 Pease Planer.
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No. 1 Cincinnati Universal Milling Machine.
1½" Pratt & Whitney Bolt Cutter.
10" New Haven Shaper.
60" Niles Boring Mill.
Two 4-spindle gang drills.
1" wire feed screw machines.
No. 2 Brown & Sharpe Plain Grinder.
Cutter & Reamer Grinder.
Pond Index Miller.
Lincoln Slab Miller.

The above machines are complete and in good order. Most of them are the same as new.
Send for Photos, descriptions, etc.
Agents for Cincinnati Milling Machine Co., Bickford Drill Co., Windsor Machine Co., L. W. Pond Machine Co., Nicholson & Waterman, Ferracute Machine Co. and other first-class manufacturers.

PRENTISS TOOL & SUPPLY CO.,
59 S. Canal St., Chicago.

Equaled by Few, . . Excelled by None.

"HAMMOND" AND "ACME"

HIGH GRADE FIRE BRICK

MANUFACTURED BY

Reese, Hammond & Co.,
BOLIVAR, PA.

Correspondence Solicited.

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COMMISSION DEALER IN
Iron Ore, Pig Iron
AND METALS.
Cleveland, - Ohio.

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PETER GERLACH & CO.,
MAKERS OF
Saws, Tools and Machinery.
Office and Warerooms, 28 Columbus St.
Factories on Columbus, Winter and Leonard Sts
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THE CONDIT-FULLER CO.,
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Oglebay, Norton & Co.,
Successors to Tuttle, Oglebay & Co.
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FROM MARQUETTE, GOGEBIC AND MENOMINEE DISTRICTS.
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J. H. OUTHWAITE. W. G. POLLOCK.
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Exclusive attention given to
LAKE SUPERIOR AND MENOMINEE RANGE
IRON ORE.
Perry-Payne B'l'd'g, - Cleveland, O.

RICHARD A. PARKER., C. E.,
Consulting Mining Engineer.
—SPECIALTIES—
Iron, Gold and Silver Mining.
Offices: 100 W. Washington St., CHICAGO. MARQUETTE, MICH.

BUYERS' DIRECTORY OF IRON AND STEEL TRADES.

Analytical Chemists—
Cary & Moore, Chicago, Ill.
Dickman & MacKenzie, Chicago, Ill.
Hollis & Emmerton, Chicago, Ill.

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Magnolia Anti-Friction Metal Co., New York.

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Weber & Co., Cincinnati, O.
G. B. Schulte Sons Co., Cincinnati, O.

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E. H. Jones & Co., Cleveland.
Brightman Stoker Co., Cleveland, O.
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Wm. B. Pollock & Co., Youngstown, O.
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C. P. Adams, 807 Cuyahoga Bldg., Cleveland, O.
S. Freeman & Sons Mfg. Co., Racine, Wis.
Armstrong Bros., Springfield, O.
The J. C. McNeil Co., Akron, O.
Vulcan Iron Works Co., Toledo, O.
R. Laird & Son, Galion, O.

Bolts and Bolt Machinery—
Upson Nut Co., Cleveland.

Boring and Turning Mills—
Bickford Drill & Tool Co., Cincinnati, O.
H. Bickford, Lakeport, N. Y.
Dawson & Goodwin, Chicago, Ill.

Chain Belting—
Jeffrey Mfg. Co., Columbus, O.

Chemists—
Cary & Moore, Chicago, Ill.
Dickman & MacKenzie, Chicago, Ill.
Hollis & Emmerton, Chicago, Ill.

Chilled and Sand Rolls—
The Lloyd-Booth Co., Youngstown, O.
Wm. Tod & Co., Youngstown, O.
Totten & Hogg I. & S. F'dry Co., Pittsburg, Pa.

Coal and Coke—
W. J. Rainey, Cleveland, O.
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Akron, Canton & Chicago	*8:00 A M	*6:30 P M
Wooster and Garrett	†3:00 P M	†11:00 A M
Wooster		*6:30 P M
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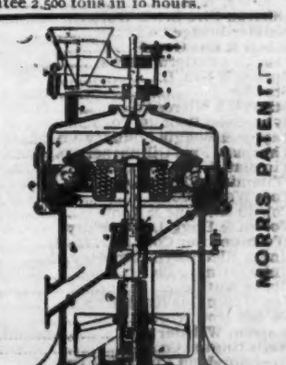

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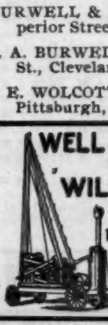

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The reading matter is of such a nature as to be of practical value and interest to hardware dealers. It does not discuss mechanical or manufacturing topics, because its subscribers are hardware dealers, not makers of hardware.

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For the simple reason that it gives them an honest equivalent for their money, by placing their announcements in the hands of the buyers of their goods at a reasonable cost.

For Sample Copy and Rates, address,

The Hardware Dealers' Magazine,

D. T. MALLETT, PUBLISHER,
78 Reade St., NEW YORK.

IRON AND STEEL MARKETS.

IRON ORE.

[On Lake Erie docks.]

No. 1 Specular, Bessemer	3.00@ 3.35
No. 1 Bessemer hematite	2.75@ 3.00
Hematites No. 1 non-Bessemer	2.00@ 2.50
No 1. Specular, non-Bessemer	2.35@ 3.00

PIG IRON.

CLEVELAND (f. o. b. cars):	
Bessemer	$13 00@$13 50
No. 1 Strong Foundry	11 25@ 11 50
No. 2 Strong Foundry	10 25@ 10 50
No. 1 Gray Forge, red short	9 50@ 9 75
No. 2 Gray Forge, neutral	9 25@ 00 00
No. 1 American Scotch	11 65@ 00 00
No. 2 American Scotch	10 65@ 00 00
Lake Superior Charcoal	14 00@ 14 25
PITTSBURG:	
No. 1 Foundry	$11 25@$11 50
No. 2 Foundry	10 50@ 11 00
Gray Forge	9 75@ 0 00
White and Mottled	9 00@ 9 25
Warm Blast Charcoal	18 00@ 19 00
Cold Blast Charcoal	22 00@ 26 00
Bessemer	13 25@ 13 50
CHICAGO (reported by our representative:)	
Lake Superior Charcoal	$14 50@$15 00
Local Coke Foundry No. 1	11 50@ 12 00
Local Coke Foundry No. 2	10 50@ 11 00
Local Coke Foundry No. 3	10 00@ 10 50
Local Scotch Foundry No. 1	11 50@ 11 75
Local Scotch Foundry No. 2	10 75@ 11 25
Local Scotch Foundry No. 3	10 25@ 10 75
Southern Coke No. 1	10 75@ 11 00
Southern Coke No. 2	10 75@ 11 00
Southern Coke No. 3	10 50@ 10 75
Southern No. 1 Soft	10 75@ 11 00
Southern No. 2 Soft	10 50@ 10 75
Southern Silveries No. 1	11 50
Southern Silveries No. 2	11 00
Jackson Co. Silveries	15 50@ 16 00
Ohio Silveries No. 1	14 00@ 14 50
Ohio Silveries No. 2	13 00@ 13 50
Ohio Strong Softeners	13 00@ 14 00
Alabama Car Wheel	17 75@ 18 25
Southern Charcoal No. 1	14 50@ 15 00
Southern Charcoal No. 2	14 00@ 14 50
Malleable Bessemer	11 75@ 12 00
Coke Bessemer	11 25@ 11 50
CINCINNATI (reported by Rogers, Brown & Co.)	
Southern Coke No. 1, Foundry	$10 25@$10 50
Southern Coke No. 2 and No. 1 Soft	9 50@ 9 75
Hanging Rock Coke, No 1	12 00@ 12 50
Hanging Rock Charcoal No. 1, Fdy	16 00@ 17 00
Tennessee Charcoal No 1	14 00@ 14 50
Jackson County Stone Coal No 1	14 50@ 16 00
Southern Coke, Grey Forge	8 75@ 9 00
" " Mottled	8 50@ 8 75
Standard Alabama Car Wheel	16 25@ 17 25
Tennessee " "	15 50@ 16 00
Lake Superior " "	16 00@ 16 50
BUFFALO (reported by Rogers, Brown & Co.)	
No. 1 Foundry Strong Coke Iron Lake Superior Ore	$11 50
No. 2 Foundry Strong Coke Iron Lake Superior Ore	11 00
Ohio Softener No. 1	11 50
Jackson Co. Silvery No. 1	15 75@ 16 75
Lake Superior Charcoal	14 25
Tennessee Charcoal	15 50
Southern Soft No. 1	11 25
Southern Soft No. 2	10 50
Alabama Car Wheel	16 00@ 17 50
Hanging Rock Charcoal	18 50
LOUISVILLE (reported by Geo. H. Hull & Co.)	
Southern Coke No. 1 Foundry	$10 25@$10 50
Southern Coke No. 2 Foundry	8 75@ 9 25
Southern Coke No. 3 Foundry	8 50@ 8 75
Gray Forge	8 00@ 8 50
Southern Charcoal No. 1 Foundry	12 50@ 13 50
Car Wheel	15 00@ 15 50
Spathite	11 25@ 11 75
ST. LOUIS (reported by Rogers, Brown & Meacham):	
Southern Coke No 1	$10 75@$11 00
Southern Coke No. 2	10 00@ 10 25
Southern Coke No. 3	9 50@ 9 75
Southern Gray Forge	9 25@ 9 50
Southern Charcoal No. 1	14 00@ 14 50
Missouri Charcoal No. 1	13 00@ 13 50
Ohio Softeners	14 00@ 14 50
Lake Superior	16 50@ 17 00
Southern	16 75@ 17 25
Connellsville Coke, St. Louis	4 20

OLD RAILS AND SCRAP METAL.

[Prices paid by mills.]

	GROSS TONS
Old iron rails	$12 00
Old steel rails	10 00
	NET TONS
No. 1 R. R. wrought scrap	$ 9 00
No. 1 wrought scrap	8 50
No. 1 Machine cast scrap	8 50
Iron axles	15 00
Axle turnings	8 00
Wrought turnings (free from cast)	6 50
Cast borings	4 75
Uncut wrought iron boilers	3 00
Steel boiler plates	8 00
Grate bars	4 00
Pipes and flues (clean)	7 00
Tank iron	6 00
Hoop and band iron	5 00
Sheet iron	5 00
Wrought drillings	6 00
Malleable iron	7 00

Frank P. Cady, Pres. and Supt.
Geo. H. Bowler, Sec'y and Treas.
THE CADY MFG. CO.
283 W. River St., CLEVELAND, O.

WIRE STRAIGHTENERS AND CUTTERS.
Power Presses, Dies, Drop Hammers, Punches and Shears, Special Machinery, Wire Forming Machines. . . . .

PERFORATED METALS
OF ALL KINDS FOR
MILLING MINING AND AGRICULTURAL MACHINERY,
PERFORATED IRON, STEEL, COPPER, BRASS, TIN, ZINC, LEAD, ETC., TO ORDER.
LARGE AND VARIED ASSORTMENT OF SIZES. CORRESPONDENCE SOLICITED.
THE ROBERT AITCHISON. PERFORATED METAL CO.,
OFFICE, ROOM 510 265 TO 269 DEARBORN STREET, CHICAGO, ILL. WORKS SOUTH CHICAGO.

Horse AND Mule Shoes
SHEETS, BARS, SLABS AND BILLETS.
Light Sheets for TINNING AND PERFORATING a Specialty.
Geo. H. Sibell & Co., 614-218 La Salle St., Chicago.

FUEL OIL BURNERS.
J. R. Armstrong's System of Burning
Crude Petroleum.
WHY IT IS THE BEST.
Send for Catalogue.
JOHN R. ARMSTRONG COMPANY,
35 West Monroe St., Chicago, Ill.

A. H. LEITCH, PRES JOHN C. LEITCH, SEC. AND GENL. MAN. JOHN A. WILSON, TREAS.
WESTMORELAND FIRE BRICK CO.
MANUFACTURERS OF HIGH GRADE FIRE BRICKS.
PITTSBURG, PA.
Works and Mines, Westmoreland, Pa.

PL DIXON'S PERFECT LUBRICATING GRAPHITE.
The most Marvelous Lubricant Known.
Used Dry, or Mixed with Water, Oil or Grease
NOT AFFECTED BY HEAT, COLD, STEAM OR ACIDS.
An Interesting and Instructive Pamphlet will be sent Free of Charge.
JOS. DIXON CRUCIBLE CO. Jersey City, N. J.

IRON CLAD PAINT CO.
Factory, 75 & 77 Central Way. Sec. & Treas., No. 3 Case Build'g.
CLEVELAND, OHIO.

Trade Mark Patented.

ORDER DIRECT FROM THE
Iron Clad Paint Co.
And get the genuine article, and save liability of suit for using an article made in violation of the patents issued to Wm. Green, and now owned by this Company.
IRON CLAD PAINT is the most durable, most fire-proof and Cheapest Paint made.
FURNISHED both Dry and Ground in Oil
USED BY NEARLY ALL THE RAILROADS.

STRUCTURAL MATERIAL.

Beams and Channels (f. o. b. mill)	1.30c@1.40c
Angles	1.20c@1.25c
Tees	1.40c@1.50c
Universal Plates	1.35c
Sheared Plates	1.35c

MERCHANT IRON AND STEEL.

[List prices out of store.]

Flat Bar.

1½ to 4 by ⅜ to 1 inch	1 30
4¼ to 6 by ⅜ to 1 inch	1 35
1½ to 6 by 1⅛ to 2 inch	1 50
1¼ & 1⅜ by ⅜ to ¾ inch	1 35
1 & 1⅛ by ⅜ to ¾ inch	1 40
⅝, ⅞, ⅞, by ⅜ to ¾ inch	1 50

Round and Square.

1 to 1⅞ inch	1 30
2 to 2⅜ inch	1 40
2¼ to 3¼ inch	1 55
3⅜ to 4 inch	1 80
4⅛ to 4½ inch	2 40
4¼ to 5 inch	2 60

Oval.

⅜ to 1¼ inch	1 50
⅝ to ¾ inch	1 50
½	1 70
⅝	1 90

Half Oval and Half Round.

1¼ to 3 inch	1 85
⅜ to 1¼ inch	1 65
⅜ to ¾ inch	1 90
½	2 05
⅝	3 15

Heavy Band.

1¼ to 6 by ¼ and 5-16 inch	1 40
1 to 1¾ by ¼ and 5-16 inch	1 45
¾ to ⅞ by ¼ and 5-16 inch	1 55
½ to ⅝ by ¼ and 5-16 inch	1 80

Hoop Iron.

1 7-16 to 4, No. 13, 14, 15 and 16	1 85
1 7-16 to 2, No. 17, 18 and 19	1 90
1 7-16 to 2, No. 20	2 00
1 7-16 to 2, No. 21	2 10
1 7-16 to 2, No. 22	2 20
1⅛ to 1⅜, No. 13, 14 and 15	1 90
1⅛ to 1⅜, No. 16, 17 and 18	1 95
1⅛ to 1⅜, No 19 and 20	2 00
1⅛ to 1⅜, No. 21	2 10
1⅛ to 1⅜, No. 22	2 20
15-16 and 1 inch, No. 13, 14 and 15	1 85
15-16 and 1 inch, No. 16, 17 and 18	2 00
15-16 and 1 inch, No. 19 and 20	2 10
15-16 and 1 inch, No. 21	2 20
15-16 and 1 inch, No. 22	2 30
⅞, No, 13, 14 and 15	2 10
⅞, No. 16. 17 and 18	2 20
⅞, No. 19 and 20	2 30
⅞, No. 21	2 40
⅞, No. 22	2 50
13-16, No. 13, 14 and 15	2 20
13-16, No. 16, 17 and 18	2 30
13-16, No. 19 and 20	2 40
13-16, No. 21	2 50
13-16, No. 22	2 60
¾, No. 13, 14 and 15	2 30
¾, No. 16, 17 and 18	2 45
¾, No. 19 and 20	2 55
¾, No. 21	2 65
¾, No. 22	2 75
11-16, No. 13, 14 and 15	2 55
11-16, No. 16, 17 and 18	2 60
11-16, No. 19 and 20	2 70
11-16, No. 21	2 80
11-16, No. 22	2 90
11-16, No. 23	3 00
⅝, No. 13, 14 and 15	2 60
⅝, No. 16, 17 and 18	2 70
⅝, No. 19 and 20	2 80
⅝, No. 21	2 90
⅝, No. 22	3 00
⅝, No. 23	3 10
9-16, No. 13, 14 and 15	2 80
9-16, No. 16, 17 and 18	2 90
9-16, No. and 20	3 00
9-16, No. 21	3 10
9-16, No. 22	3 20
9-16. No. 23	3 30
7-16 and ½ inch, No. 13, 14 and 15	3 00
7-16 and ½ inch, No. 16, 17 and 18	3 10
7-16 and ½ inch, No. 19 and 20	3 20
7-16 and ½ inch, No. 21	3 30
7-16 and ½ inch, No. 22	3 40
7-16 and ½ inch, No. 23	3 50
⅜, No. 13, 14 and 15	3 50
⅜, No. 16, 17 and 18	3 60
⅜, No. 19 and 20	3 70
⅜, No. 21	4 00
⅜, No. 22	4 10
⅜, No. 23	4 25

Light Band.

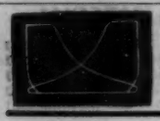
1½ to 6 by ⅛ to 3-16 inch	1 60
1½ to 6 by Nos. 11 and 12	1 65
1 to 1¾ by ⅛ to 3-16 inch	1 65
1 to 1¾ by Nos. 11 and 12	1 70
⅞ and 13-16 by ⅛ to 3-16 inch	1 80
⅞ and 13-16 by Nos. 11 and 12	1 85
¾ and 11-16 by ⅛ to 3-16 inch	1 90
¾ and 11-16 by Nos. 11 and 12	1 95
⅝ and 9-16 by ⅛ to 3-16 inch	2 05
⅝ and 9-16 by Nos. 11 and 12	2 10
½ by ⅜ to 3-16 inch	2 20
½ by Nos. 11 and 12	2 25

Wagon Box Iron.

⅞ inch, beveled edge, by Nos. 11 and 12	1 80
⅞ inch, " " " " 13 and 14	1 90
¾ inch, " " " " 11 and 12	1 95
¾ inch, " " " " 13 and 14	2 15

Sheet Iron.

No. 10	1 85
No. 12	1 90
No. 14	1 95



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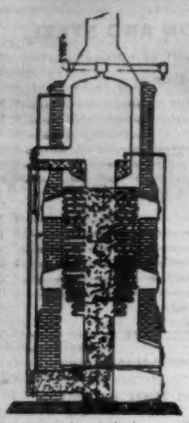
THE ADAMS

WATER TUBE BOILER.



This Boiler is absolutely safe from explosion. Gives as much steam from the waste heat as any boiler made. Easy of access for cleaning and repairs. Furnishes perfectly dry steam. Occupies little ground space. Economical in first cost. Send for complete circulars giving list of users and testimonials, one of which is printed below.

The Falcon Tin Plate & Sheet Co.,
NILES, O., Aug. 18, 1893.

Chas. P. Adams, Esq.

Dear Sir: The three boilers of 225 H. P. each which you furnished us are working in every way satisfactory. We consider them as good steamers as any we have ever used. Up to the present time have spent nothing on them for repairs. Very respectfully,

THE FALCON TIN PLATE & SHEET CO.,
By Warner Arms, Pres't.

C. P. ADAMS.

807 The Cuyahoga, - CLEVELAND. O.

EUREKA FENCE RATCHET.

SIMPLE, STRONG AND CONVENIENT TO HANDLE.

All parts held together by a pin inside of box; no losing of pawls or rollers. It can be adjusted quickly and be bought cheap. Both large and small sizes. Write for prices and terms. Address,

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We are the only Steel Roofing Co. awarded Medal and Diploma for **PATENT CAP ROOFING** at World's Columbian Exposition. We are also large manufacturers of all styles of METAL ROOFING, SIDING, CEILING, ETC. Send for Catalogue and Price List. Mention this paper.

SYKES IRON & STEEL ROOFING CO., - Chicago and Niles, O.

STEEL CASTINGS

FROM 1 TO 40,000 POUNDS WEIGHT.
Of Open Hearth, Chester or Bessemer Steel.
True to Pattern. Sound. Solid.
GEARING OF ALL KINDS, CRANK SHAFTS, KNUCKLES FOR CAR COUPLERS.
Cross-Heads, Rockers, Piston Heads, etc., for Locomotives.
Steel Castings of every Description
CHESTER STEEL CASTINGS CO.,
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(PRINCIPAL)
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Welles Building,
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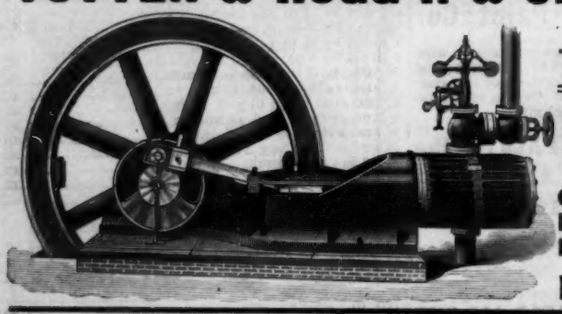
MINING MINERAL AND TIMBER LANDS.

Municipal Bonds, Large Tracts of Florida
Farm and City Mortgages, Phosphate and
Short Time Paper. Hammock Lands.

EXAMINATIONS AND REPORTS MADE. Correspondence Solicited.

TOTTEN & HOGG I. & S. F'DRY CO.



Manufacturers of
The "Ætna" Rolling Mill
ENGINE
Chilled and Sand Rolls and Rolling Mill Machinery.
Pittsburg, Pa.

Subscribe for THE IRON TRADE REVIEW; $3.00 per year.

No. 15-17	2 05
No. 18	2 20
No. 20	2 30
No. 22-24	2 40
No. 25 26	2 50
No. 27	2 60

Steel Boiler Plates—1-4 in. and Heavier.

Tank	1 60
Shell	1 85
Flange	2 10
Marine Flange	2 35
Fire Box	3 35

Above includes plates 90 inches wide.

90 to 96 in. wide	⅜c. ℔. extra
96 to 100 in. wide	1 c. "
100 to 104 in. wide	1½c. "
104 to 106 in. wide	special

American Cast Tool Steel.

ROUND, SQUARE AND OCTAGON.	cts. ℔s.
1 to 2 in. inclusive	08
9-16 to ⅞ in. "	08½
7-16 to ⅜ and 2⅜ to 3 in	09
3⅜ to 4 in	09½
⅜ to 11-16 and 4⅛	10
⅛ to 6 in	10½
¾ to 9-32 and 6⅛ to 7 in	11
3-16 in	13

Flats.

	cts. ℔s.
2 to 9-16 in. wide by 2 to ⅜ thick	8

Bessemer and O. H. Steel.

Machinery	base price, 1 80
Tire	" 1 85
Spring	" 2 20
Sleigh Shoe	" 2 20
Toe Calk	" 2 05
Cutter Shoes, tapered and bent	" 2 45

English Tool Steel.

Jessop's	15½c
Hobson's "Best"	15½c
" "Choice"	35c

Burden Boiler Rivets.

⅛, ¼, 11-16 and ¾ inches diameter	3 70
Bridge ⅛, ¼, 11-16 and ¾ inch diam	3 40

MACHINERY SUPPLY MARKET.

Anvils.

American	℔ 9@10
Wright's	℔ 12

Bellows.

Blacksmiths' Hill's	dis 40
Blacksmiths' Bullock's	dis 50&10
Moulders'	dis 40@40&10
Hand	dis 40&10@50

Belting.

Boston Belting Co.'s standard	dis 70
" " " extra	dis 60&5
" " " best	dis 55
Cleveland Rubber Co. extra standard	dis 60&10
Hoyt's Short Lap	dis 45
Shultz Raw Hide Leather Belting, single,	dis 40
Munson's Short Lap Single Leather	dis 50
Munson's Short Lap Double and Light Double Leather	dis 50&10
Shultz Raw Hide Leather Belting, Double and Light Double	dis 40
Standard, oak tanned	dis 50&10
Alexander Brothers' pure oak tanned	dis 45

Blowers and Exhausters.

B. F. Sturtevant's	dis 20
Boston Blower Co.	dis 35
Buffalo	dis 40

Chucks.

Cushman's 4 Jaw Independent	dis 45
" Combination	dis 40
" Geared Scroll	dis 30
" 2 Jaw Brass Workers	dis 30
" Drill	dis 35
Wescott's Scroll Combination	dis 33⅓
" Independent	dis 40
" Little Giant Drill	dis 35
Horton's Universal	dis 40
" Independent	dis 45
Whiton's Independent	dis 45
National Combination	dis 40
Sweetland "	dis 40
Almond Drill	dis 20
Morse "	dis 15
Skinner's Combination Lathe	dis 40&10
" Independent Lathe	dis 40&10
" Universal Lathe	dis 40&10
" Drill	dis 20

Cutters and Reamers.

Cleveland	dis 10@15
Pratt & Whitney	dis 10@15
Standard	dis 10@15
Morse	dis 15
Brown & Sharpe, Milling Cutters	dis 15
" " Gear Cutters	dis 15

Crowbars.

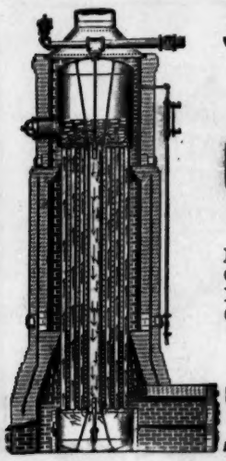
Cast Steel	℔ 3½
Iron, steel points	℔ 1b 3

Drill and Drill Sockets.

Twist Drills	dis 50&10
Morse Taper and Straight Shank to 1¼"	dis 50&10
Morse Taper and Straight Shank Larger than 1¼"	dis 25
Drill Sockets	dis 25
Standard Twist Drills	dis 55@55&5
Cleveland " "	dis 55@55&5

Emery.

	No. 4 to No. 54 46 gr.	150 gr.	Flour, C. F F. FF.
Kegs, ℔	4½c	5 c	2½c
½ kegs ℔	4¾c	5½c	2¾c
¼ kegs ℔	5 c	5½c	3 c
10 ℔ cans, 10 in case	6 c	6½c	5 c
10 ℔ cans less than 10	10 c	10 c	7½c



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SOLE BUILDERS OF THE

Cook Patent Water Tube Boiler

THE ONLY PERFECT WASTE-HEAT BOILER.

No incrustation.
Generates the greatest amount steam with least amount heat.
Repairs reduced to a minimum.
Can be used equally as well for direct firing or with natural gas.

WE ARE ALSO BUILDERS OF

HORIZONTAL, TUBULAR, AND FLUE BOILERS, OIL TANKS AND WATER STAND PIPES.

☞ Estimates furnished promptly on receipt of specifications.

C. W. HUNT COMPANY,

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For Hoisting and Conveying Purposes.

SECTIONAL TRACK, INDUSTRIAL AND CABLE RAILWAYS.
BARROWS, COAL BUCKETS, WIRE ROPE, TIP CARS, ETC.

Moffet Portable Drill

UNSURPASSED AS A REAMER.

Weighs 48 pounds and drills from ⅜ to 2 inches diameter.

Runs with Steam or Compressed air.
Will Work in Any Position.
An Economical Substitute for Rachet Drilling.
Send for Circular.

MANUFACTURED BY

J. G. TIMOLAT

89 and 91 S. Fifth Ave., NEW YORK.

HEADQUARTERS FOR TINNERS' HARDWARE AND ROOFERS' SUPPLIES.

Largest stock, greatest variety.
Prices lower than ever.
Write us before buying elsewhere.

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ANDREW MAYER,

18 Wall St., NEW YORK,

Wants Good Real Estate Everywhere, In Exchange for Stocks, etc.

Investment Securities of all kinds, and Commercial Paper bought and sold.

Correspondence Solicited.

For Sale Second Hand.

1 Axle turning lathe, good.
1 24 in.x14 ft. engine lathe, A 1.
1 each 4 and 6 ft. radial drills, A 1.
1 heavy double punch and shears.
Several boiler rolls and other tools.
Car builder's wood-working tools.
Electric dynamos, large and small, guaranteed.
Hoisting engines, single and double.
Slide valve and automatic engines, all sizes.
Pile driving outfits.
Stone crushers, several sizes.
Stone derricks, 10 tons capacity.
Steam hammers, medium sizes.

If you wish to buy or sell machinery of any kind write

W. H. ROBERTSON,

54-60 S. Canal St., -:- CHICAGO, ILL.

Emery Cloth and Paper.

Barder, Adamson & Co.	dis 50@50&5
H. H. Barton	dis 50@50&5

Emery Wheels.

Detroit	dis 60@70
Norton's	dis 60@70
Grant	dis 60@70
Sterling	dis 60@70
Celluloid	dis 10&33⅓
Northampton	dis 55
Crystal	dis 65@70
Vitrified	dis 60@70
Vulcanite	dis 60&10
Hamden	dis 60&10@70
Cyclone	dis 60@60&10

Files.

Arcade	dis 60&10@60&10&10
Nicholson	dis 60&10@60&10&10
" X. F	dis 25
Kearney & Foot	dis 60&10@60&10&10
Black Diamond	dis 60&10@60&10&10
McClellan	dis 60&10@60&10&10
Disston's	dis 65@70
Western	dis 70
Stub's	dis 25
Grobet's	dis 30
Reynolds Bros.' Hand Cut	dis 50
Industry File Works Hand Cut	dis 50

Hammers.

P. S. W	dis 40
Atha new list, Jan. 15, 1887	dis 50
Heavy hammers and sledges under 5 lbs	12c
" " " " over 5 lbs	10c

Jack Screws.

Illinois Bolt Co. list	dis 75

Nuts and Washers.

Size of bolt inches	¼	5-16	⅜	½	⅝	¾	⅞	1
Square	8	7	5½	4¾	4	3½	3⅛	
Hexagon	15⅝	11⅛	8½	6	5¼	3⅝		
Washers	9	8	7	5	4½	4¼	4⅛	

In lots less than 100 lbs, ₩ lb add ½c., 1 lb boxes add 1c to list.

Nails (wire).

List July 14, 1887	dis 85
Standard Penny Nails, ₩ keg card rate	
{ Car lots	$1.10
{ Less than car lots	$1.25

Oilers.

Zinc and Tin	dis 60
Brass and Copper	dis 50
Malleable (Hammer's), No. 1, $3.60; No. 2, $4.00; No. 3, $4.40 ₩ doz	dis 10@10&10

Packing, Steam.

Boston Belting Co.	dis 60
American Packing Hemp	₩ lb 9@10
Russia " "	₩ lb 14
Italian " "	₩ lb 13@19
Plumbago Piston	₩ lb 40
Peerless	₩ lb 60
Morrison's "	₩ lb 45
Square Flax "	₩ lb 50
Sheet Rubber	₩ lb 12&24
Excelsior Rubber	₩ lb 48
Rainbow { Full Rolls	45c ₩ lb
Rainbow { Less than Full Rolls	50c ₩ lb
Eclipse Gasket	₩ lb 75

Picks.

Railroads, 5 to 6 lbs	$12 dis 60
" 6 to 7 lbs	$13 dis 60

Pulleys.

Iron Pulleys, Walker List	dis 50
Medart Pulleys	dis 50
Split Wood Pulleys	dis 55@60

Rivets.

Iron, Thousand, list November 17, 1887	dis 50&10@60
Iron, Ordinary, Cooper's Block and Carriage list November 17, 1887	dis 50&10@60
Copper	dis 50@50&10

Saws.

Disston's Circular	dis 40&10
" Band	dis 25
" Scroll	Net
Hack Saw Stubs	dis 20
" " Eureka	dis 20
" " Star	dis 20
Saw Swages Diston's	dis 30
Atkins' Circular Saws	dis 40&45
" Mill, Mulay and Drag Saws	dis 40&10
" Wood Saws	dis 40&10
" Silver Steel Diamond Cross-cut Saws	70c per ft
" Dexter Cross-cuts	50c "
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Excelsior Saw Tools	$6 per doz
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Petroit Saw Works, Circular	dis 50
" " " Band	dis 25
" " " Mulay	dis 45

Taps.

Cards, Hand and Nut to 2 in	dis 50
Carpenters' " " "	dis 50
Morse " " "	dis 50
Pratt & Whitney " " new list	dis 10
Machine Screw Taps	dis 55
Pipe Taps to 2½ in	dis 70
Stay Bolt Taps	dis 25
Stove Bolt Taps	dis 55
Pulley Taps	dis 40

Vises.

Solid Box	dis 60
Parker's	dis 20@25
Prentiss	dis 20
Stephen's	dis 25@30
Barrett's	dis 30
Miller's Falls	dis 40
Merrill's	dis 15@20
Howard	dis 35

Wire.

New List, Apr. 9, 1894

Brass	dis 40
Copper	dis 40
Bright and annealed, Nos. 0@18	dis 70&10@75
" " Nos. 19@26	dis 75@75& 5
" " Nos. 27@36	dis 75&10& 5
Coppered Nos. 0 to 18, market list	dis 70@70& 5
Galvanized Nos. 0 to 18 " "	dis65& 5
Tinned market Nos. 0 to 18	dis 67½
Cast steel	dis 50
Tinned Broom Wire	dis 70&5@70&10
Annealed Fence, Nos. 8 and 9	dis 75
Annealed Grape, Nos. 10 to 14	dis 75
Stub's Steel Wire regular	95c ₩ ℔ dis 30

Wrenches.

Coe's genuine	dis 50
Girard Standard	dis 70&10
Agricultural	dis 75&10
Mechanic's	dis 55&10& 5
Bemis & Call's Combination	dis 35
Donohue's Engineers	dis 20&10
Lamson & Sessions Engineers	dis 60
Billings & Spencer's Drop Forged	dis 25
William's " "	dis 25
Alligator " "	dis 40

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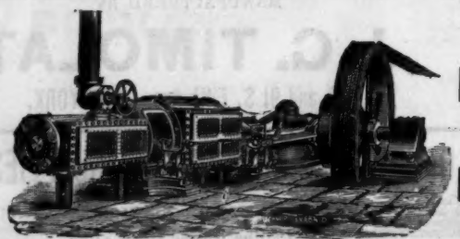

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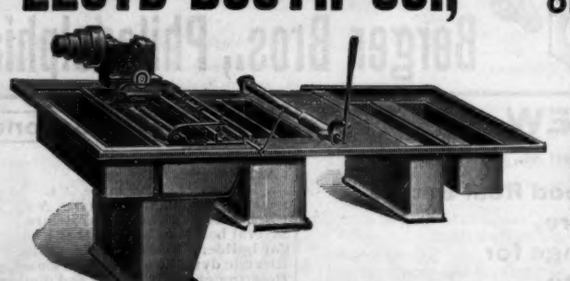

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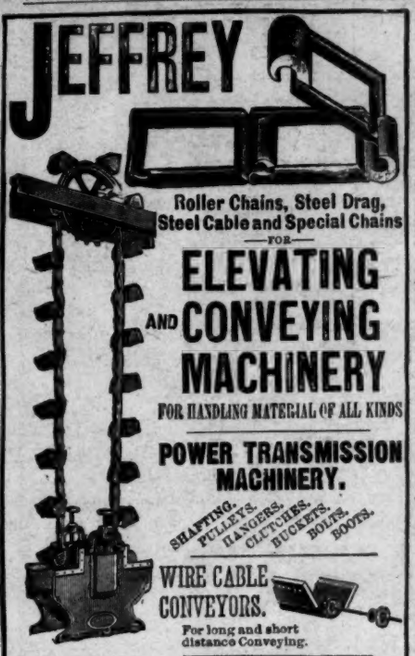

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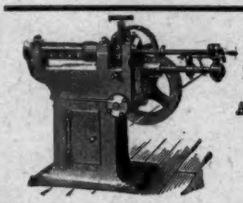

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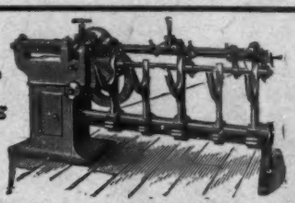

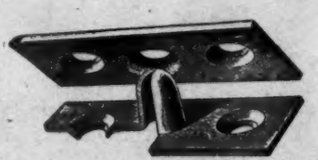

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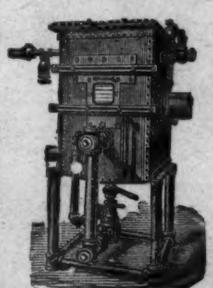

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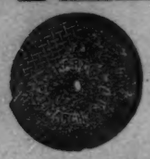

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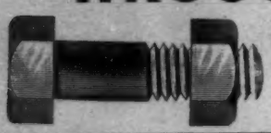

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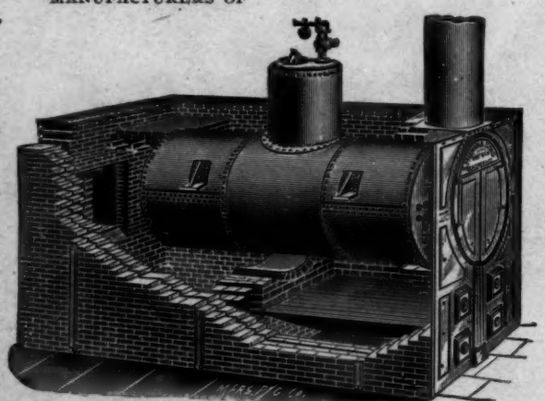

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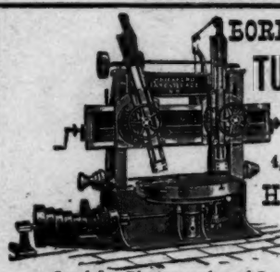

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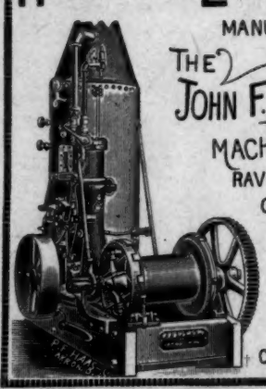

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